How To Support Your Miniatures - By Print Minis

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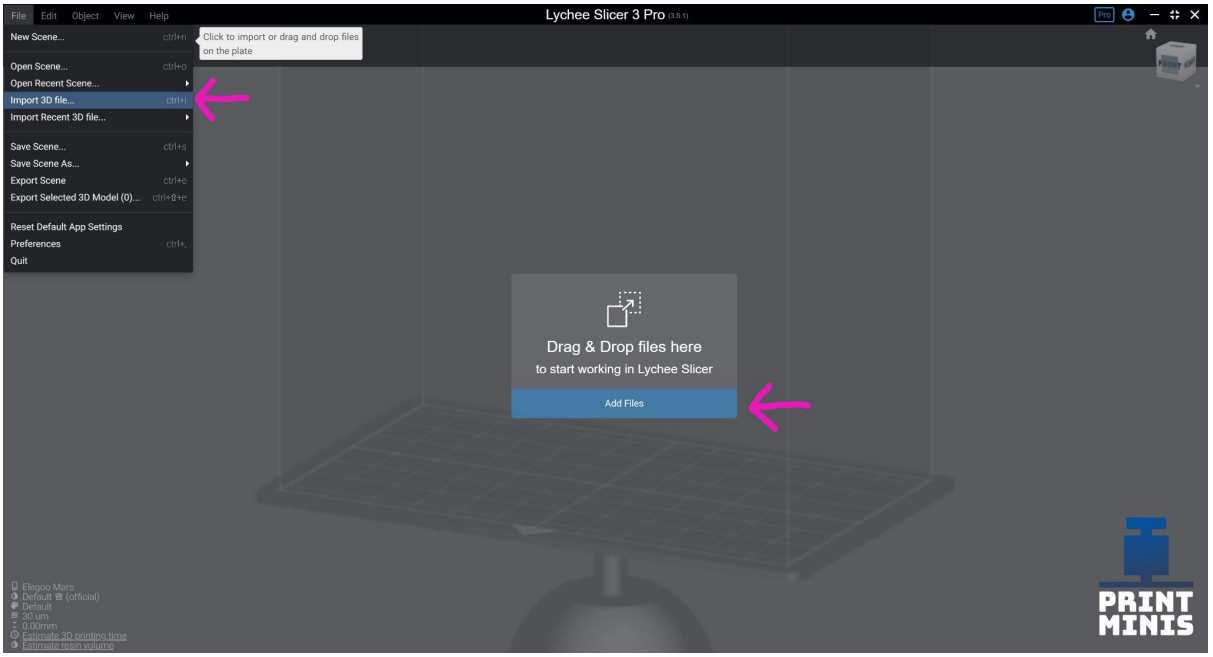
Learning how to support your own miniatures is a useful skill to have. Although many STLs come pre-supported, you may need to edit the supports, and knowing how to support miniatures properly enables you to easily do this. You'll also be able to support unsupported miniatures, opening you up to a wider availability of cool models :)

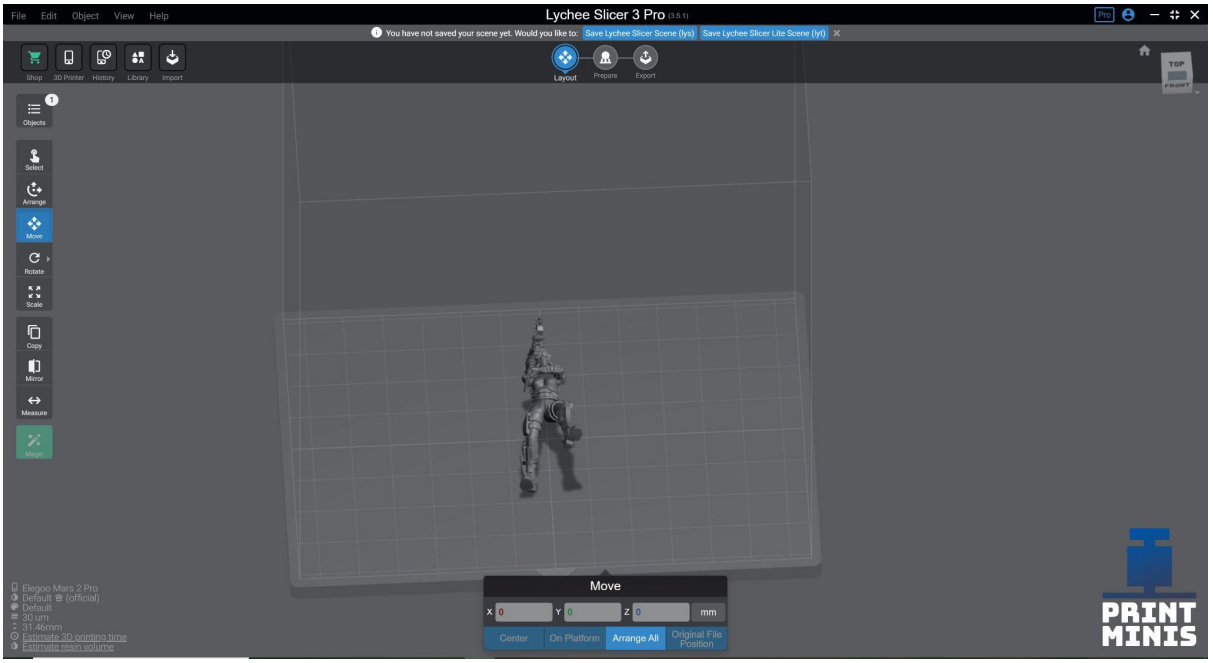
In this tutorial I'll be using Lychee Pro to support the example model. However, you can follow the principles using the free version of Lychee or other software like Chitubox.

Start by opening your Lychee software. To add a file for supporting, just click the Add Files prompt in the middle of the screen and select the STL from its location on your computer. You can also import files by selecting the Import button on the top toolbar or by following the pathway File > Import 3D File.



Your miniature will be imported onto the printer build plate. This is the grey rectangle with a white checkerboard which is in the middle of your screen. On a 3D printer, this hangs upside down from the printer axel and is lowered up and down while printing. So you'll support the miniature in an upright position in the software, but when printing, it will actually hang upside down.

For our example miniature today, we will be using Zasha.



Generally, details that face away from the build plate will be more crisp. Details facing the build plate will be slightly more squashed. It's a small difference, but is worth noting because it allows you to orientate delicate areas (like a miniature's face) away from the build plate to get a slightly better result.

Orientating Your Miniature

The first thing you'll want to do is orientate your miniature on the printer build plate into the position it will print in. The orientation can make a big difference to printing success and quality, so it's worth spending a little time on.

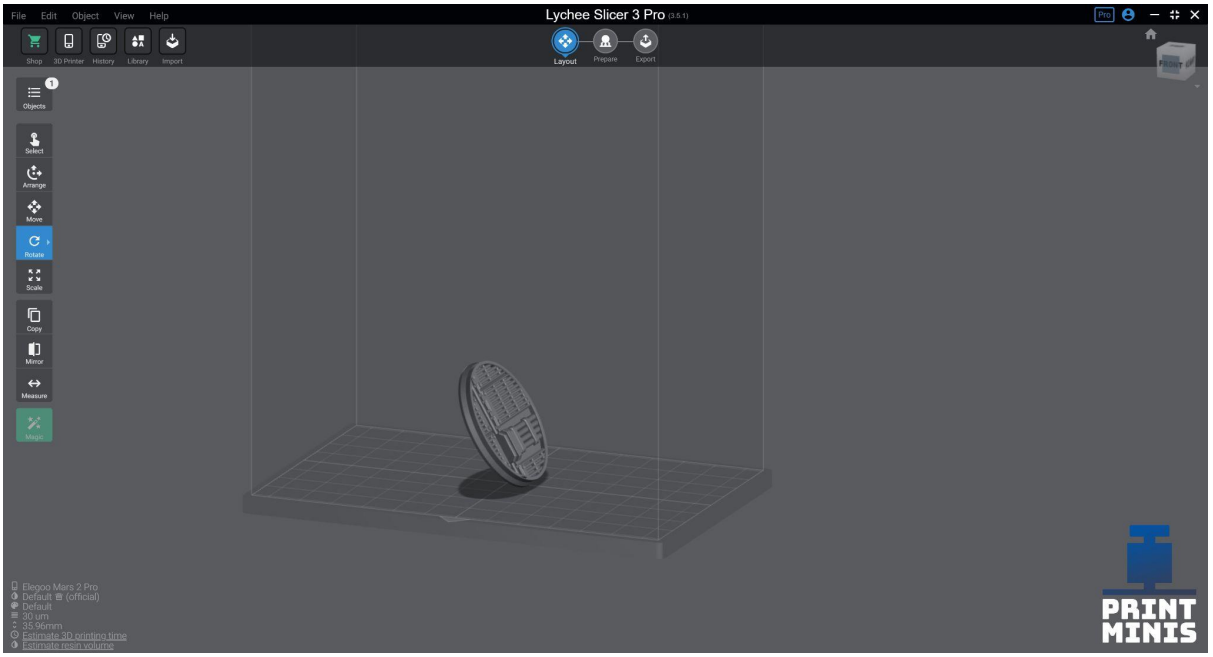
Your miniature prints in slices that are 0.03mm thick and starts from the part that touches the build plate and travels up the model until it is complete. When the build plate lowers into the tank it cures the 0.03mm layer of resin between the metal build plate and the plastic FEP, which is the clear material at the bottom of the resin tank. The build plate then raises up, pulling the cured layer of resin off the FEP, which is flexible and bows upwards.

Things to Consider

1. *Large flat surfaces*

A slice with a large surface area will be more difficult to peel off the FEP, because there is more suction force keeping it in place. Therefore when you choose an orientation, you can pick one that keeps the slices as small as possible.

This is less relevant for characters, but for miniatures with a large flat surface like a scenic base, this will involve tilting them at an angle to print instead of leaving them flat.



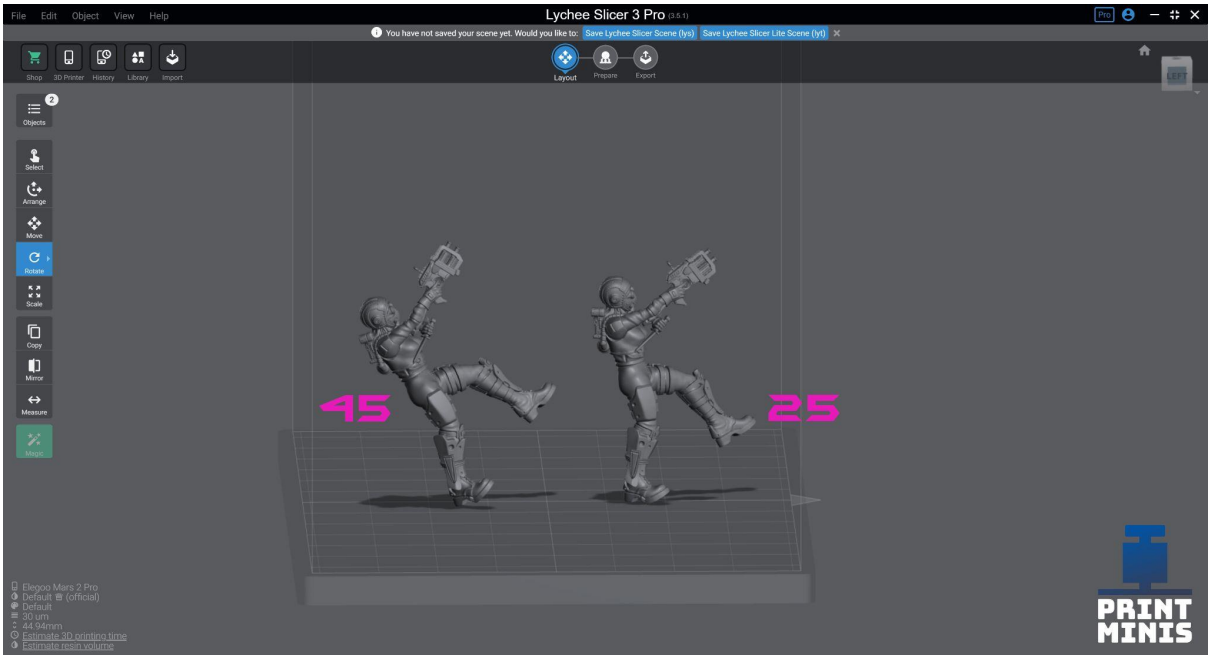
2. *The starting point for printing*

When orientating the miniature, you can think about where the model will start printing. I prefer to add a stronger support either on the area that prints first or if it's a thin edge, soon afterwards to ensure the miniature is well anchored to the build plate.

One of the reasons a print can fail is because it is pulled off the supports. This is because the model's adherence to the FEP is stronger than it's adherence to the supports on the build plate, and so when the two pull apart, the model remains stuck to the FEP.

This can be avoided by ensuring the miniature is securely attached to the supports as soon as possible. To attach the miniature securely, you need to use a heavier support (heavy proportional to the size of your miniature). So when I orientate a model, I will look at the areas where it starts printing and see if I think adding a heavy support nearby is possible.

3. *Location of the supports*



With characters, you will often hear the advice to tilt your miniature at a 45 degree angle. This is good general advice, but I don't always follow it because that usually means supports will need to be added along the back of the character where they will be visible.

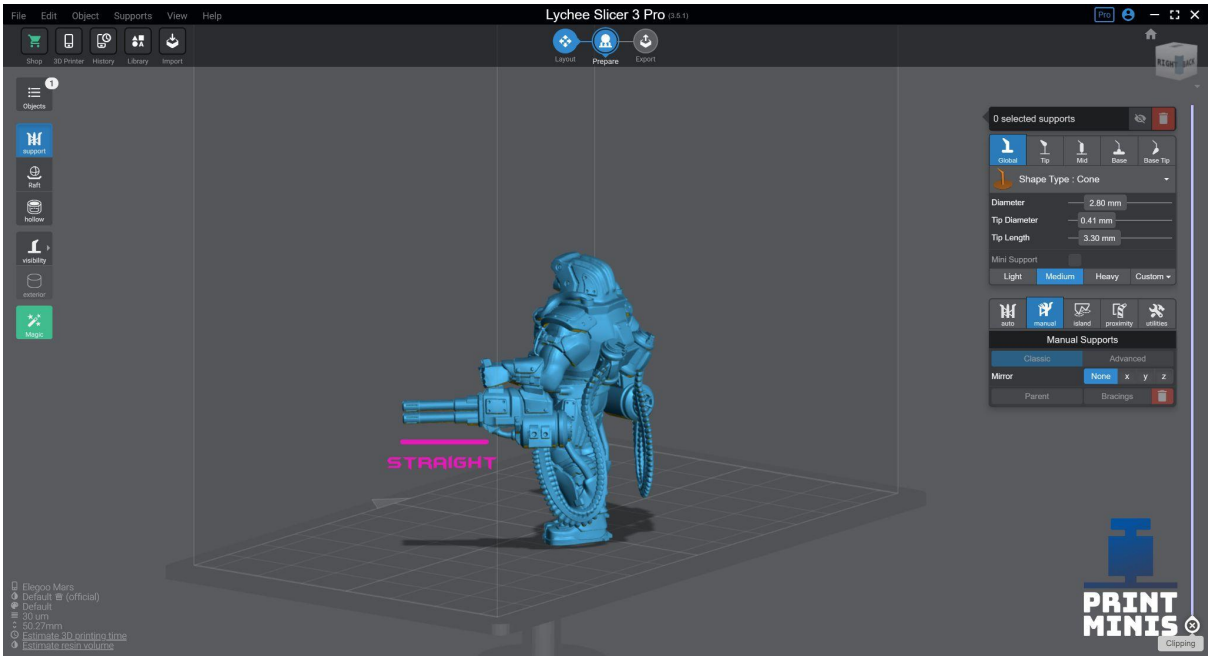
By tilting your character at a less steep angle, you can place the supports more underneath the miniature where they are less visible on the tabletop. I've found that miniatures print just as well like this, and so it's worth bearing in mind when picking your orientation.

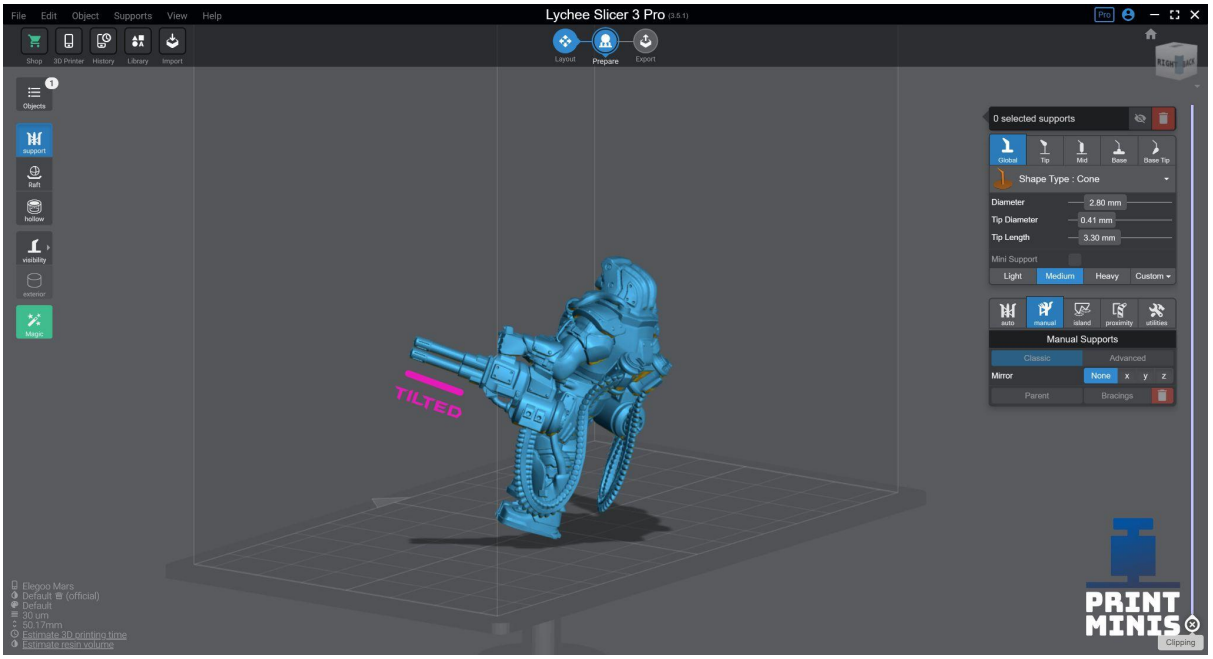
In the image above, our example character is at 45 degrees on the left and 25 degrees on the right.

4. *Long, straight sections*

As mentioned before, areas that directly face the build plate will end up a little squashed. This can be especially apparent with long straight sections of the miniature, for example Zasha is holding her gun out straight. Printing her arms directly parallel to the build plate will cause the underside of them to become slightly flattened, referred to as 'pancaking'. To reduce this, you can tilt the miniature so that any long straight sections don't print flat against the build plate and instead print at an angle. Even a slight one will be an improvement in the pancaking effect.

There is also an issue with things like long gun barrels. If the barrel is printed flat to the build plate, every time the miniature raises up and is pulled off the FEP, the barrel will be bent due to the pulling forces. This is because it is uncured and therefore flexible. After printing like this for many hours, it can appear bowed when the model is finished. Tilting any long gun barrels so they print more vertically upwards will help to reduce this.





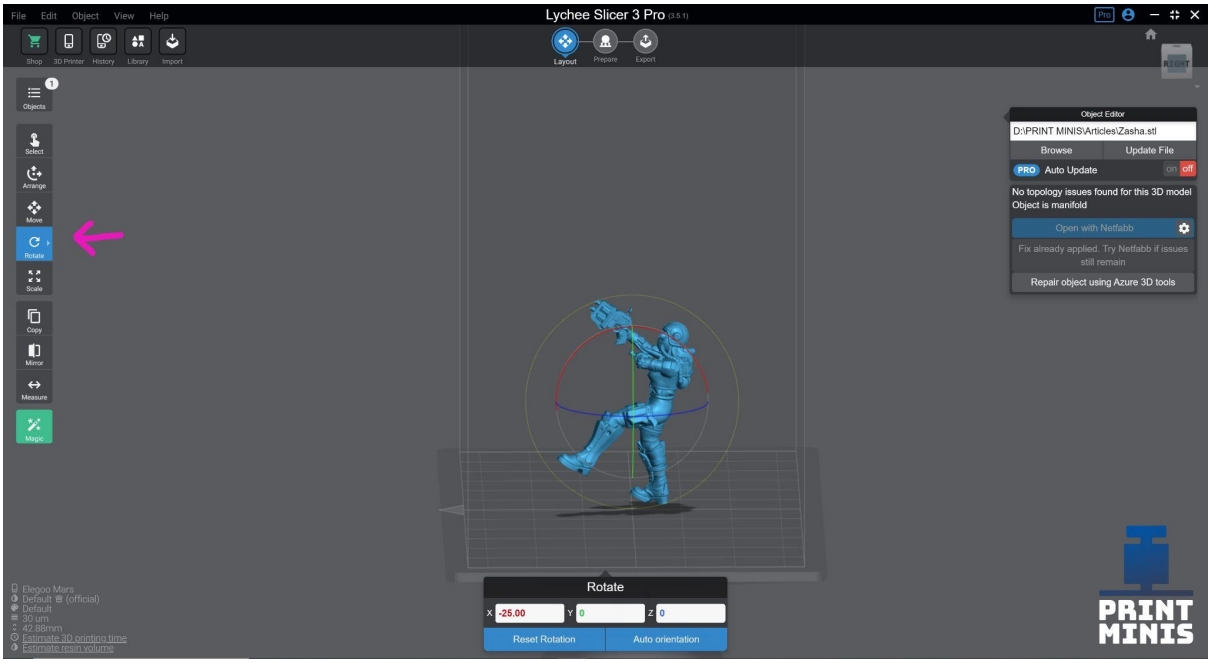
This example uses our character Titus who is wielding guns with thin, long barrels. Tilting him back slightly allows the barrels to print at an angle, which is better.

5. Number of islands

We will look at this with an example as it requires a little more explaining.

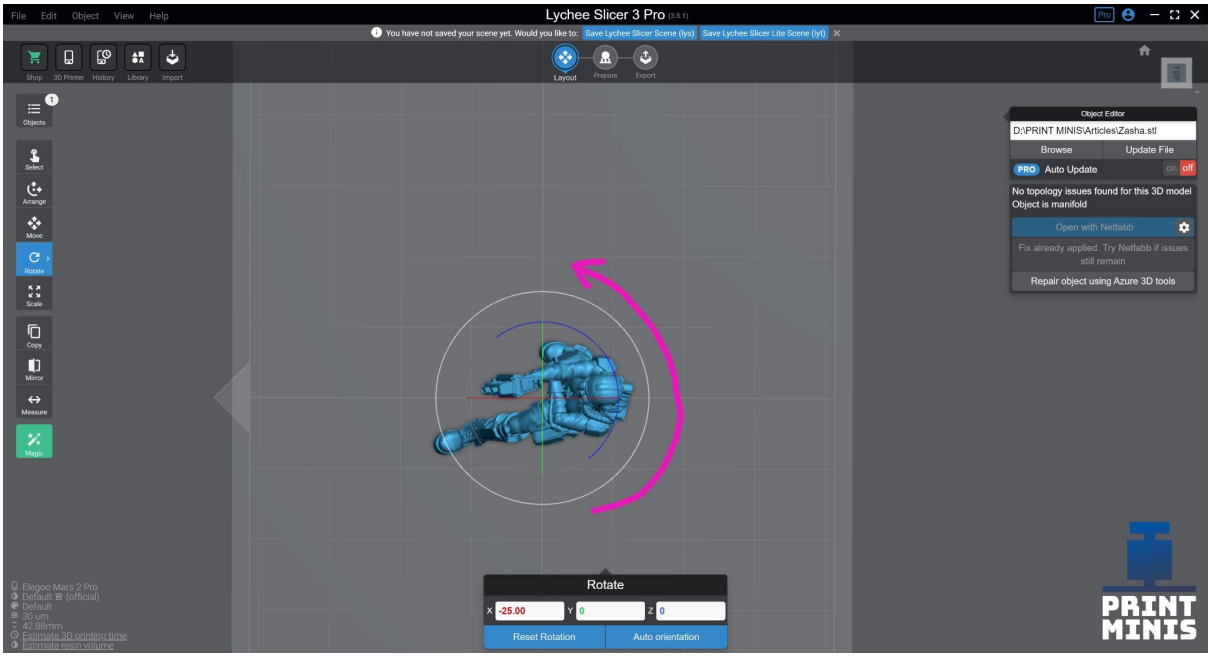
Example: Orientating Zasha

You can rotate a miniature in Lychee by clicking Rotate on the panel of buttons on the left hand side.



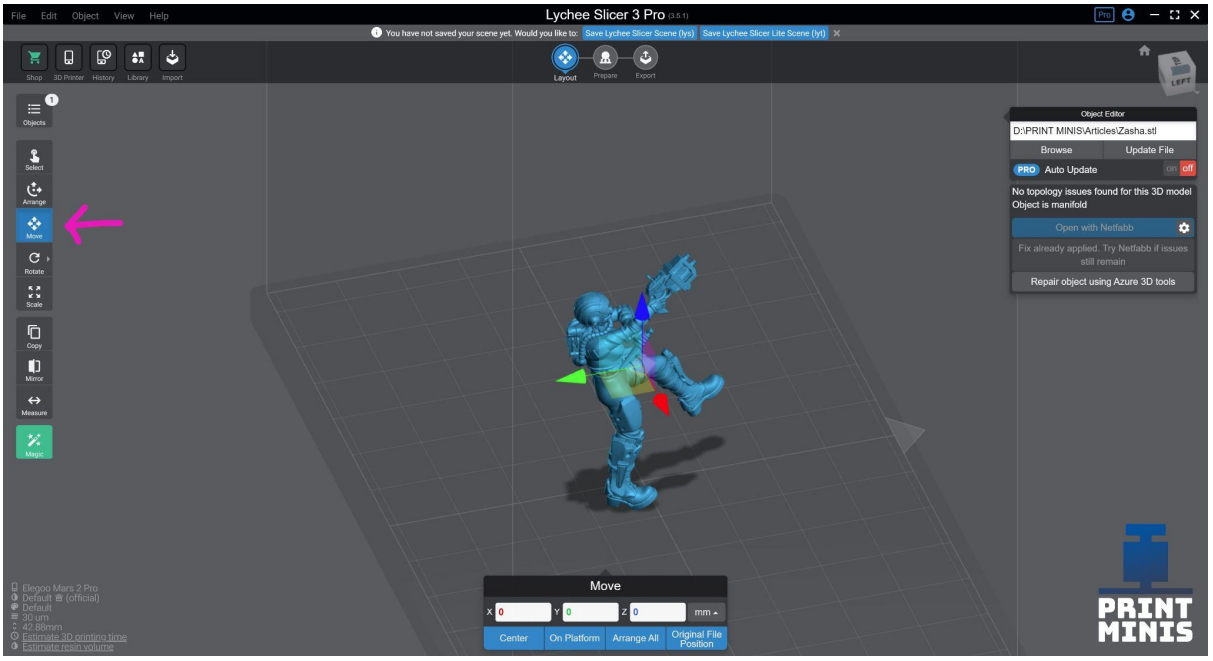
This will display three coloured circles of rotation around the miniature to indicate rotating on the X-axis, Y-axis and Z-axis. To rotate, you can either right-click, hold and drag with the mouse, or you can enter a specific number in the bar along the bottom.

There is also a larger yellow circle which rotates in the direction you're looking at the miniature. For example, if you are looking down on the miniature, the white circle will rotate along the blue Z-axis.



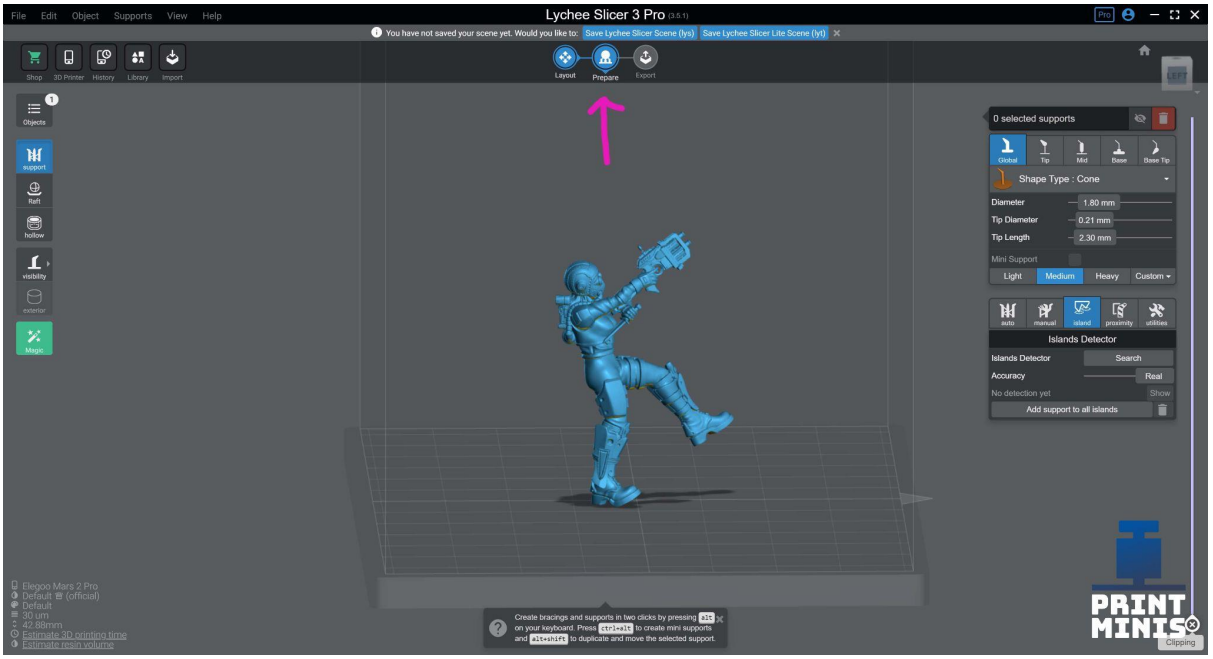
However, if you are looking at the miniature from an angle, the white circle will rotate on the green Y-axis, etc. I don't use the yellow circle because it's not always clear which axis you'll rotate on, so I usually stick to the other coloured circles, which remain fixed.

If you need to move the miniature about on the build plate, click the Move button on the left hand side of the screen. This will display three arrows on the miniature for moving along the same three axes. Just click an arrow and move the miniature in that direction using your mouse. You can also enter amounts on the bottom bar if you prefer (just like with rotating).



Tip: In order to change the angle that you look at the miniature (as opposed to moving the miniature itself) you can simply left-click and hold, then drag your mouse around to look at the model from different angles. It will move your point of view.

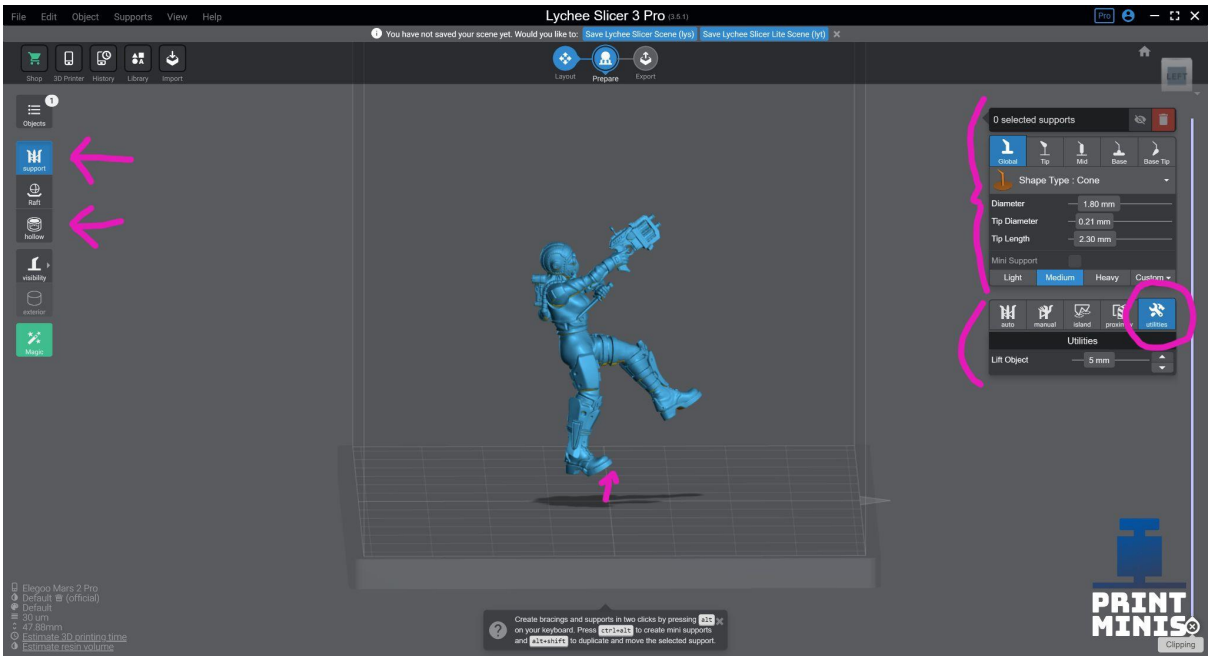
Once I have an orientation that I think looks good, I head into the Prepare stage in Lychee to double check. The Prepare stage is where you add supports to the miniature and find islands, and you get to it by clicking Prepare from the trio of buttons on the navigation bar at the top of the screen.



That will take you to a new layout where you have different options on the left hand side, such as ‘Support’ and ‘Hollow’. When you first enter the Prepare stage you will be defaulted to the Support tab - leave it on this function.

You’ll also notice there are now menu options on the right hand side in the form of two floating menus. These contain all the useful commands and options you will need when supporting your miniature.

Start by clicking Utilities on the smaller mentu, and then pressing the up arrow on the bar next to Life Object once. That will raise your miniature by 5mm off the build plate.



Why Do We Raise The Miniature?

You rarely print a miniature attached to the build plate because the first few layers printed are always overexposed to ensure strong attachment to the build plate. This overexposure flattens the resin and you don't want the lower layers of your miniature to be squashed. By raising it up, we print the miniature suspended on supports meaning that it's the supports which become squashed.

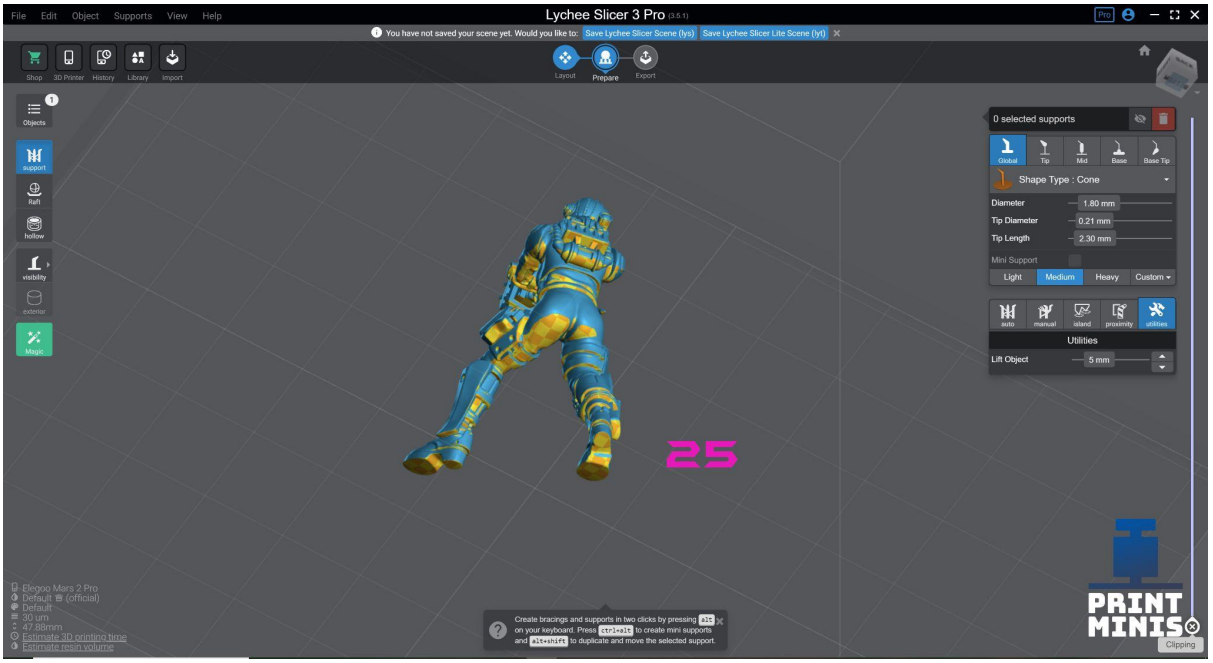
Printing attached directly to the build plate can also make the miniatures hard to remove which leaves the models vulnerable to damage or snapping when trying to remove them. Damaging or snapping the supports doesn't matter.

I raise all my miniatures by 5mm off the build plate. It's possible to raise them more than this by clicking the up arrow more times, but I find 5mm is enough.

What Does The Yellow & Orange Checkerboard Mean?

If you right-click and drag until you're looking at the miniature from underneath, you'll see that while the model was only blue in the Layout stage, in the Prepare stage there is now a yellow and orange checkerboard covering some parts of it.

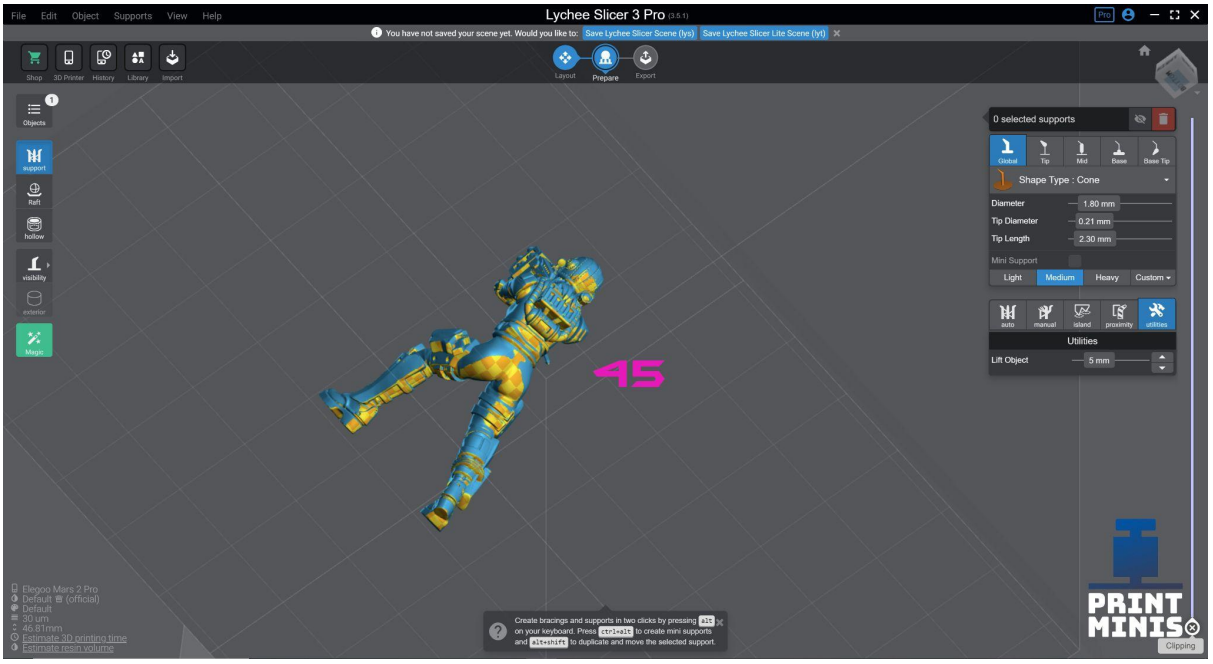
This is showing you what areas of the miniature face the build plate, which means there will be more pull forces affecting those parts, and therefore they are generally where you will place most of your supports. These are also the areas that will be slightly flattened (as mentioned earlier) and so ideally you don't want a model's face to have much checkerboard on it.



The above image shows the areas facing the build plate in the orientation I picked, which is -25 degrees on Zasha. (Note: this varies depending on how the miniature has been created.

On some models with a different initial rotation, it could be 25 degrees or 65 degrees, but the angle is the same).

If we were to change the orientation to tilt the miniature further backwards (a -65 degree angle in this example), you can see that the yellow and orange checkerboard has changed and now covers more areas of the miniature. Generally, you want to pick an orientation where you see less of this checkerboard.



Looking at The Print Layers

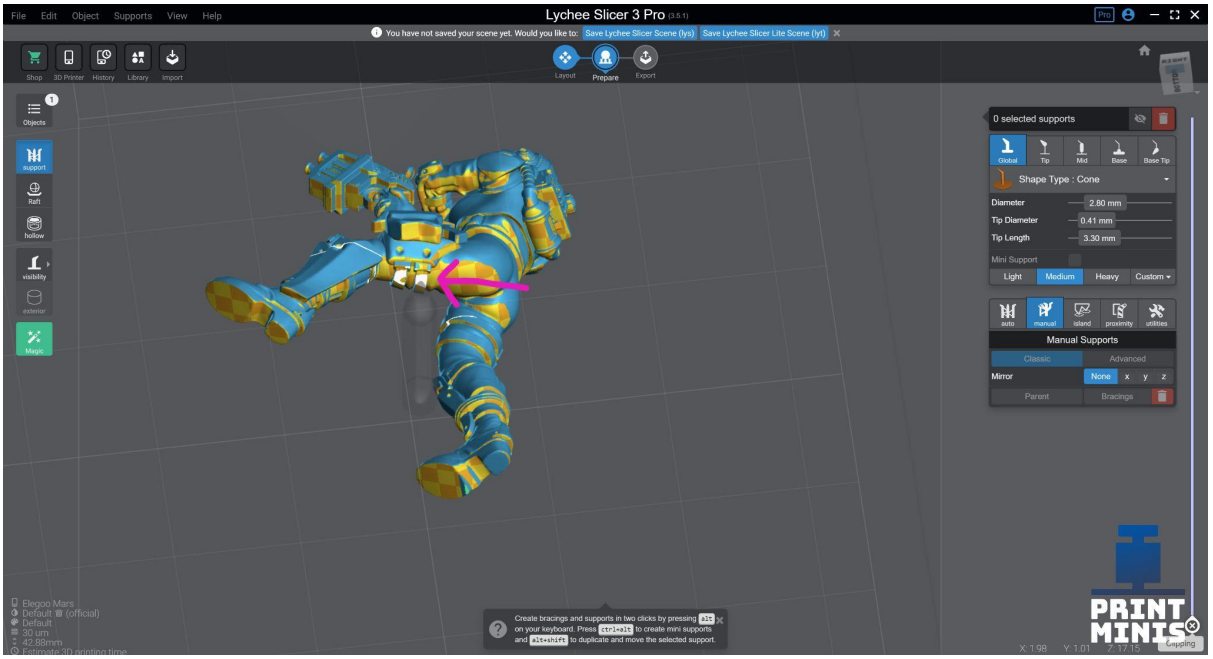
When assessing whether I like the orientation I've picked, I will check where the miniature starts printing in different areas by looking at the print layers. These are the individual slices that will print layer by layer to create your miniature.

By hovering your mouse over different parts of the model, the slice that's printing at that exact moment will be highlighted in white. This enables you to see how large the slice is and if there are any big areas that print on the same slice. I will usually look at this to see where the miniature starts printing at different points.

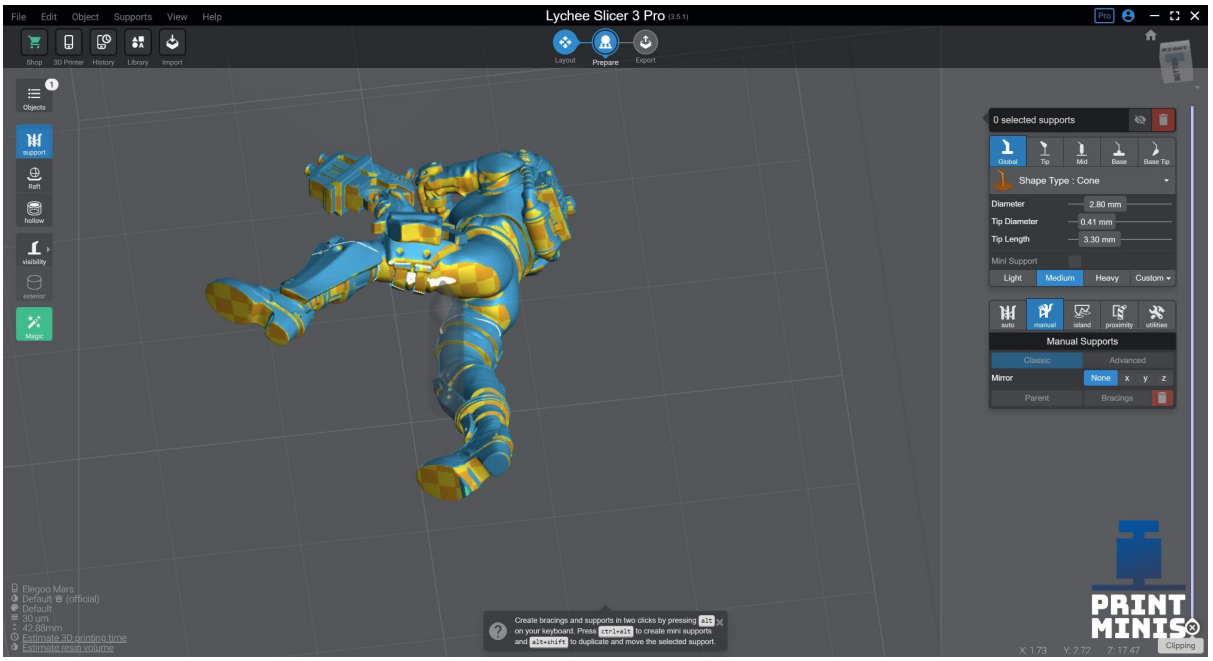
Looking at the back of the thigh area first, we can see that even though the thigh is more or less facing the build plate, it's at a slight angle and so a big section doesn't print all at once (which is when we tend to see the most pancaking/ deformation). In the three images below, we can see three different slices highlighted in white that will print.

There is also the ghostly image of a support hovering at those areas, which is created because I'm hoving the mouse over them to see the slices.

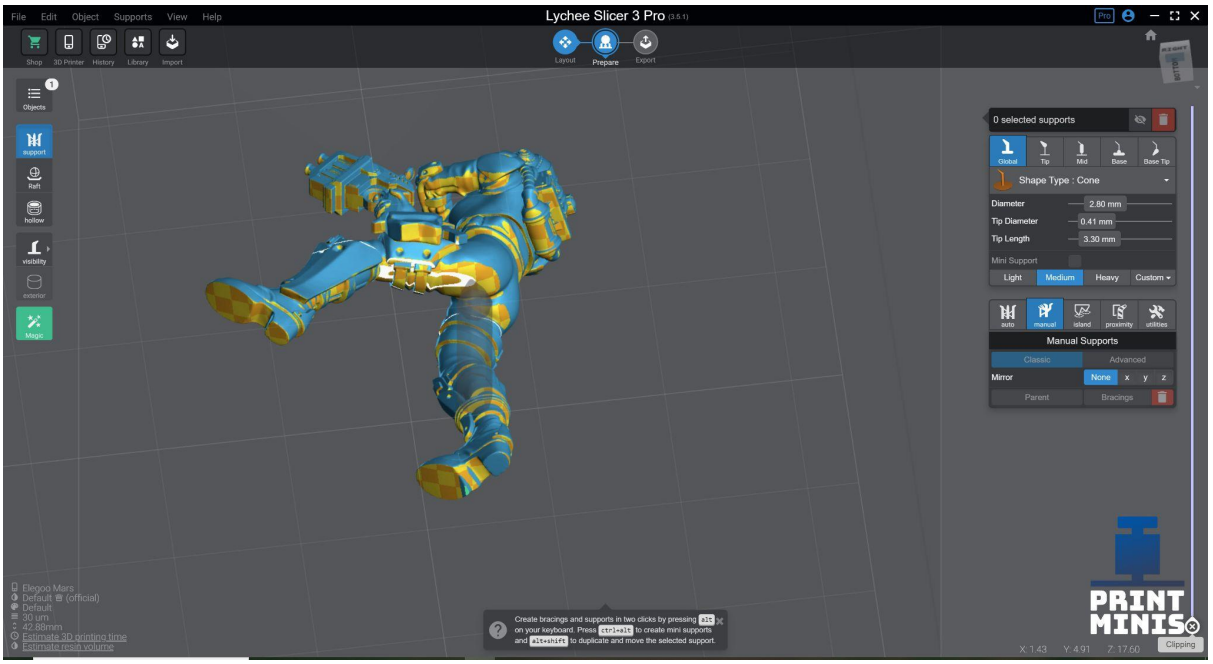
In this image, you can see the thigh starts printing on the belts in two small patches.



The next slice is two thin sections on the leg itself.



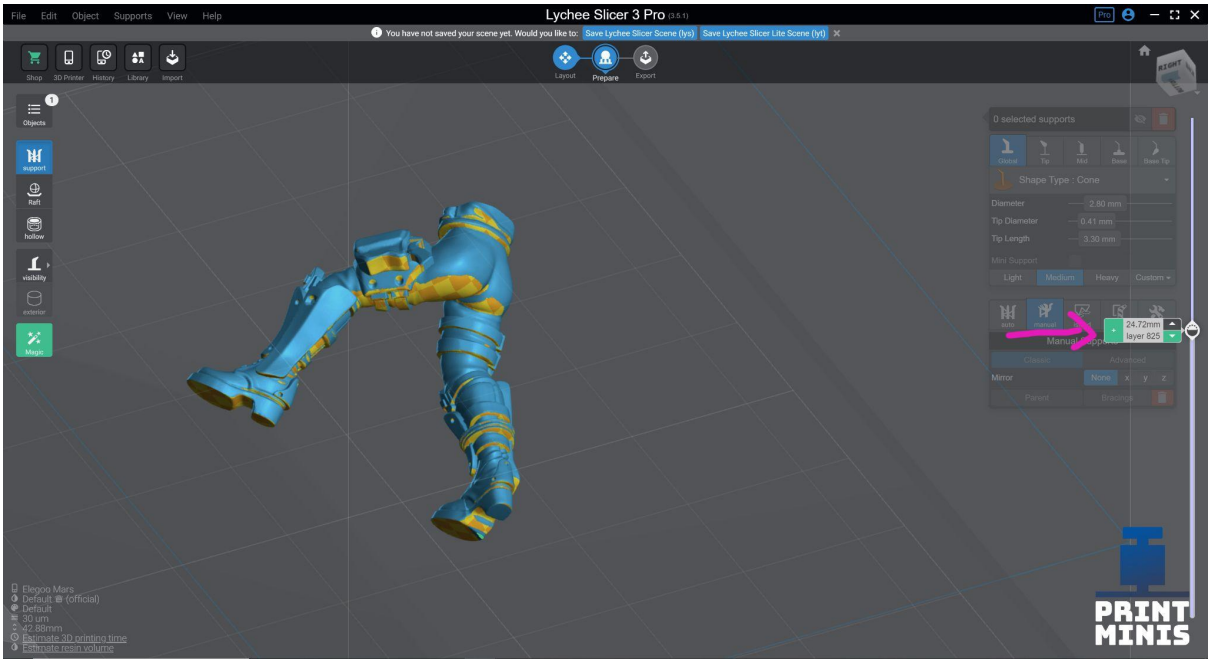
After that, the printed area continues to expand, so at this point we have the underside of the thigh printed.



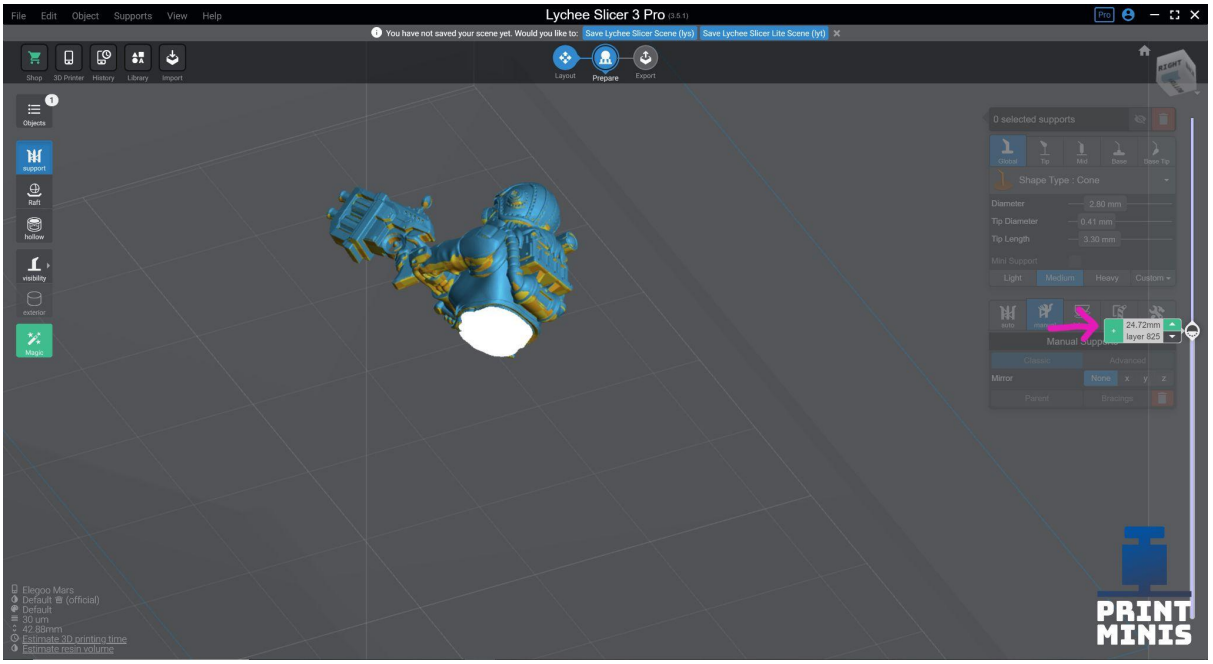
You can place your mouse anywhere on the miniature to see that area within its current slice and this will give you a good idea of how the miniature will print, where supports will need to go, and if there might be any pancaking issues (large white sections printing all at once).

Another way to see how a miniature will print, if you prefer, is to use the bar at the side of the screen. This long white bar with a cross at the bottom is scrollable and it will show you the miniature as it prints. If you hover over it, a small box will appear with turquoise up and down arrows which flips how you see the miniature.

If you have the down arrow selected, it will run from the top of the miniature, down.

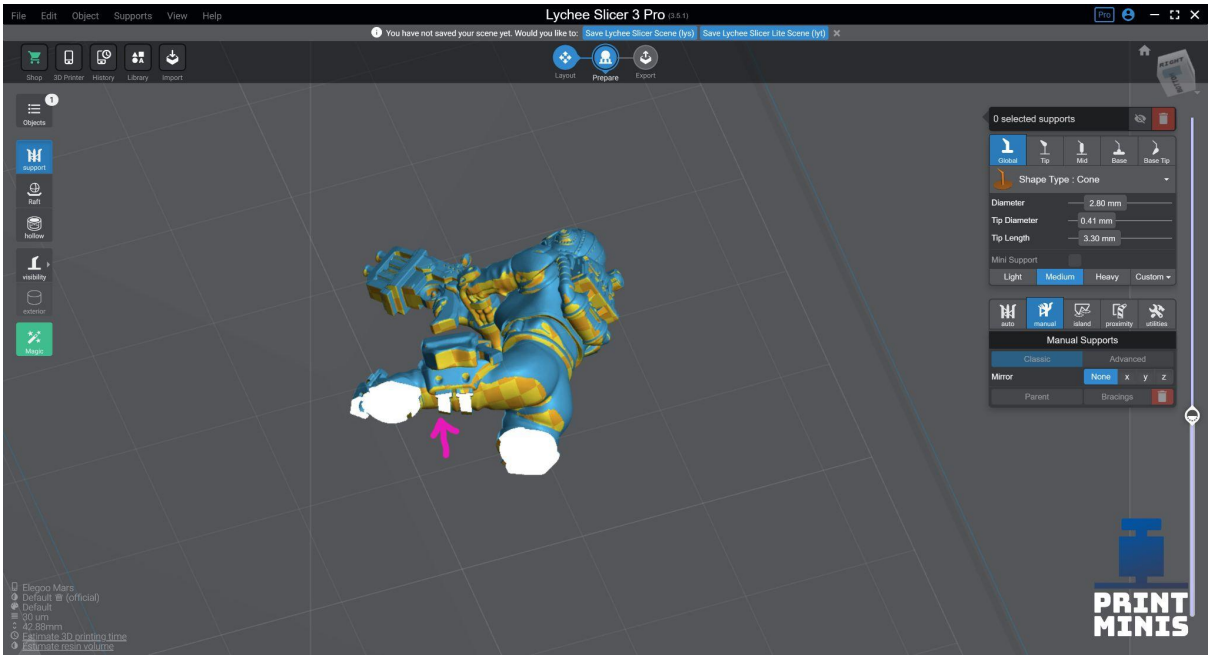


If you have the up arrow selected, it will run from the bottom of the miniature, up.



With the up arrow selected, you can watch the miniature printing if you scroll up the bar from the bottom to the top. The white area you see is the layer being printed at that point. This is perhaps a clearer representation than hovering your mouse over the mini, like I showed before.

Below you can see the thigh area we looked at earlier in various stages of printing. I find this view can be really helpful when supporting because you can see exactly how the miniature will be printed and therefore where it will need the most support.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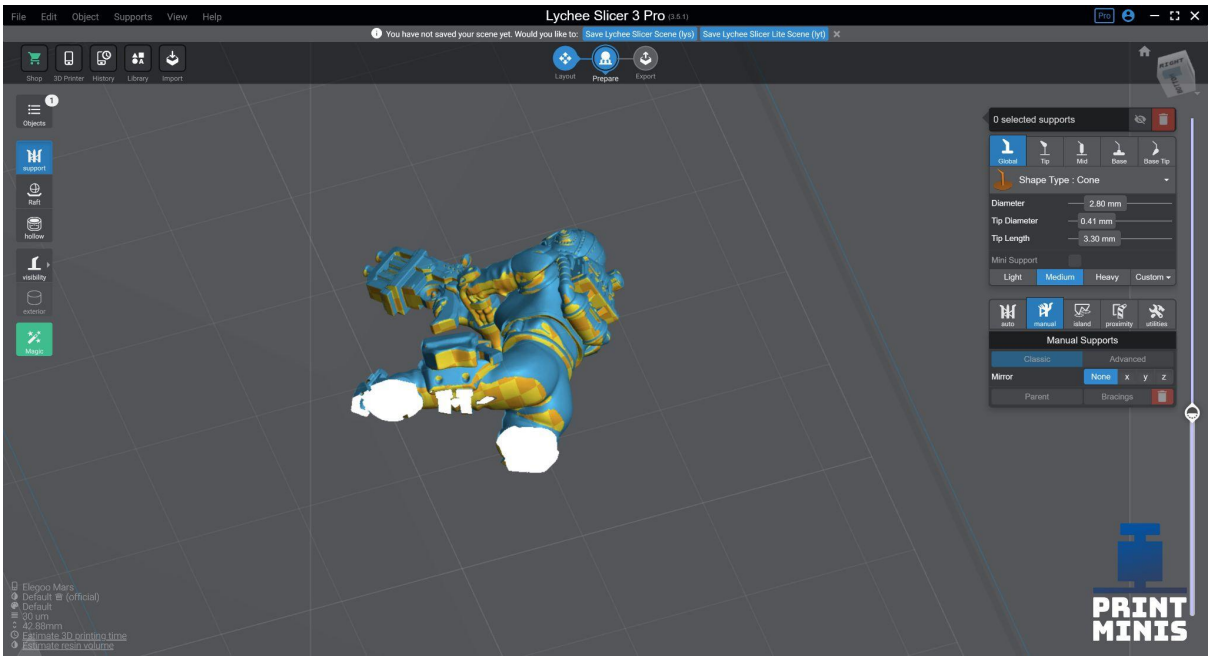
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Lychee Slicer 3 Pro (3.5.1)
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Tip Diameter 0.41 mm
Tip Length 3.30 mm
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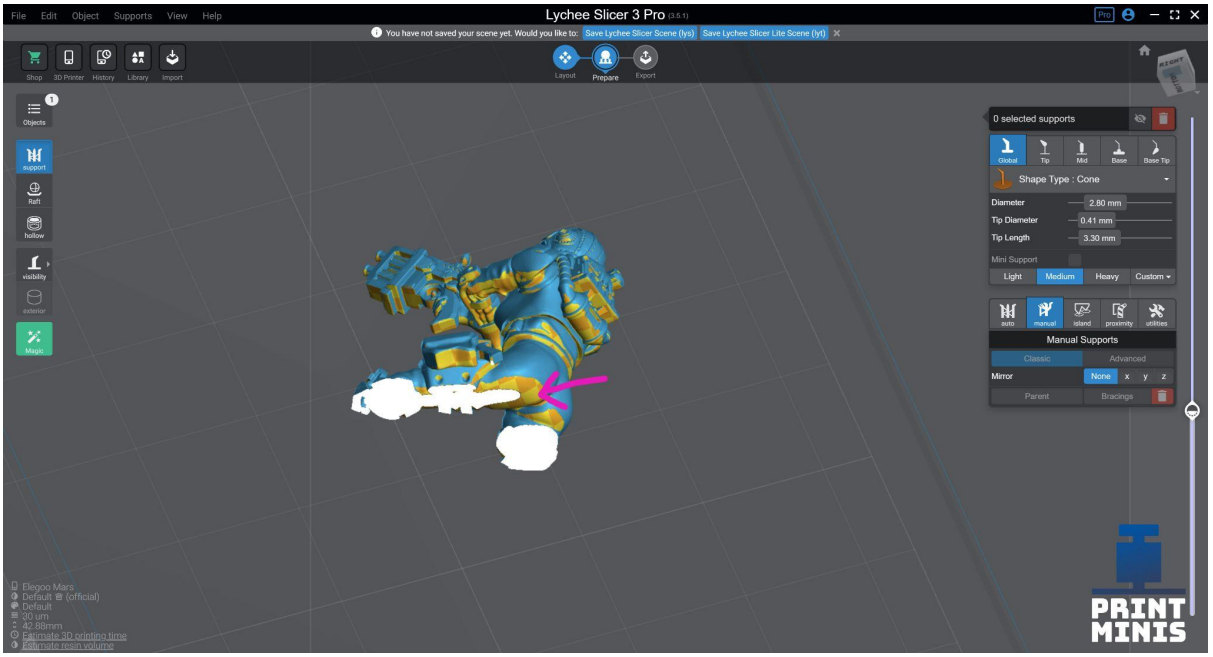


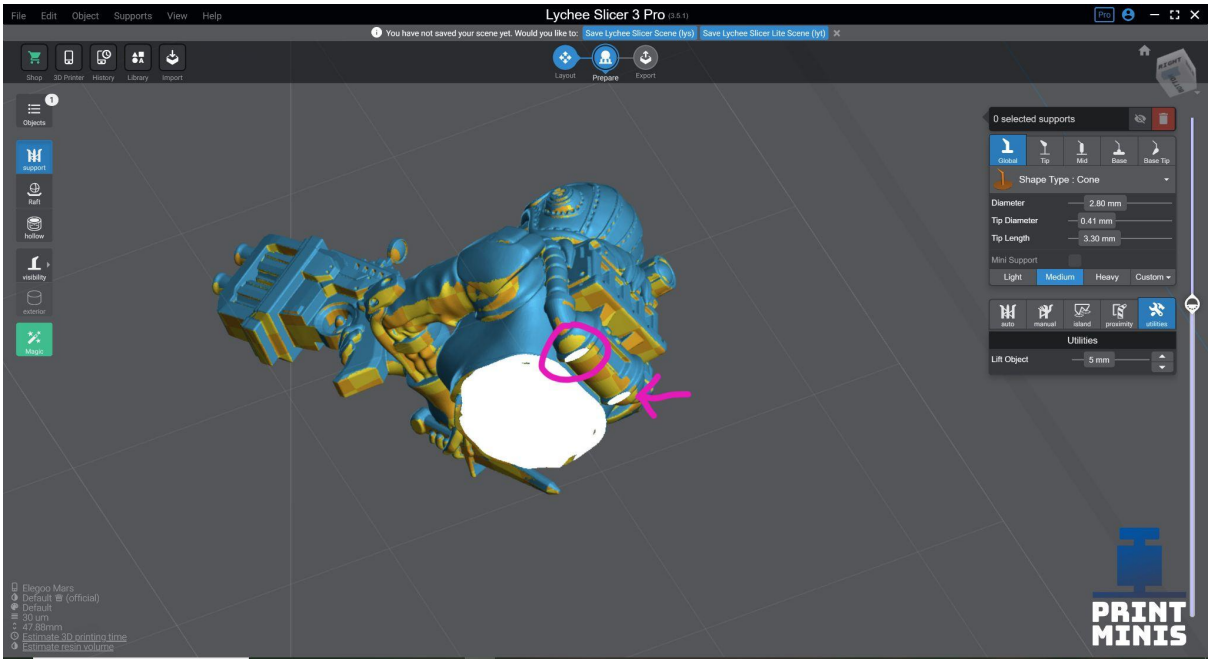
A final thing you can do to double check the orientation of your model, is to run an Island Detection. This is a feature that Lychee Slicing Software has and I couldn't imagine supporting without it!

What is an Island and Why is it Important?

An island is the place where a miniature starts printing, which isn't connected to another part of the miniature. This means it's essentially printing in 'free space', forming an island among thin air, and therefore will need a support attached to it in order to remain in place.

The parts of Zasha's feet which start printing first are each an island, because they print suspended in the air 5mm above the build plate and are connected to nothing else. In order to keep those layers in place we need to add a support to them, which connects those slices to the build plate.

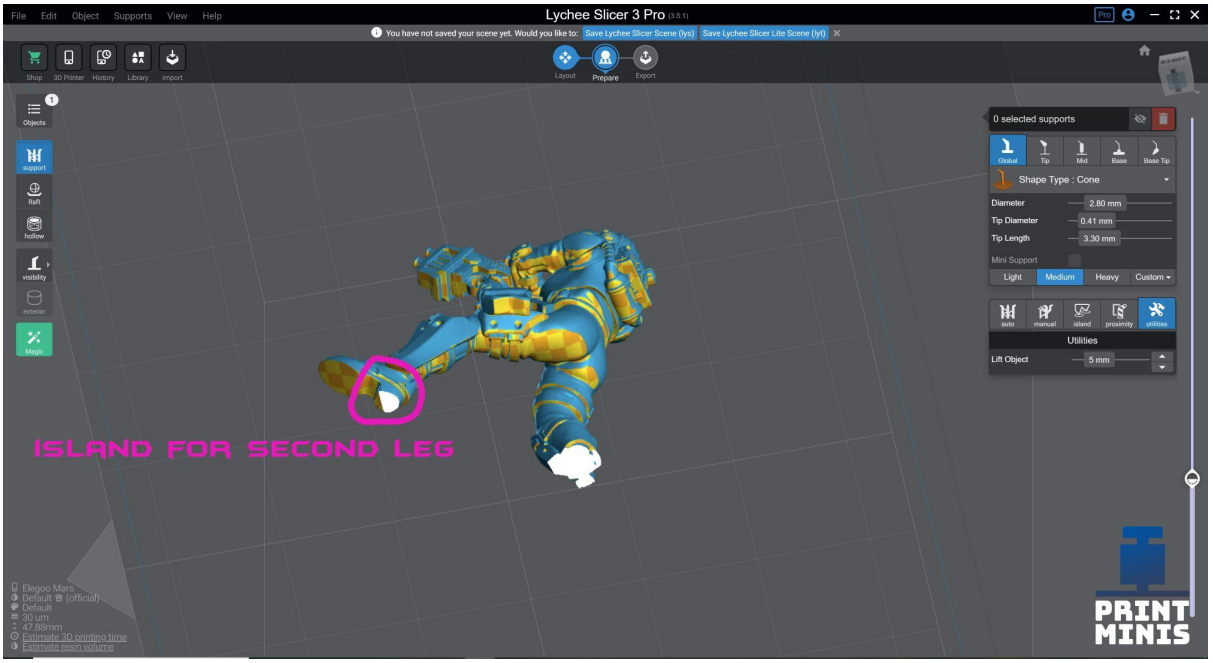
The area where a miniature first starts to print is always an island, but you can have islands all over a miniature. They can be very tiny, for example, where the edge of a detail starts to print before soon connecting to the miniature. This type of island would only require a small support.

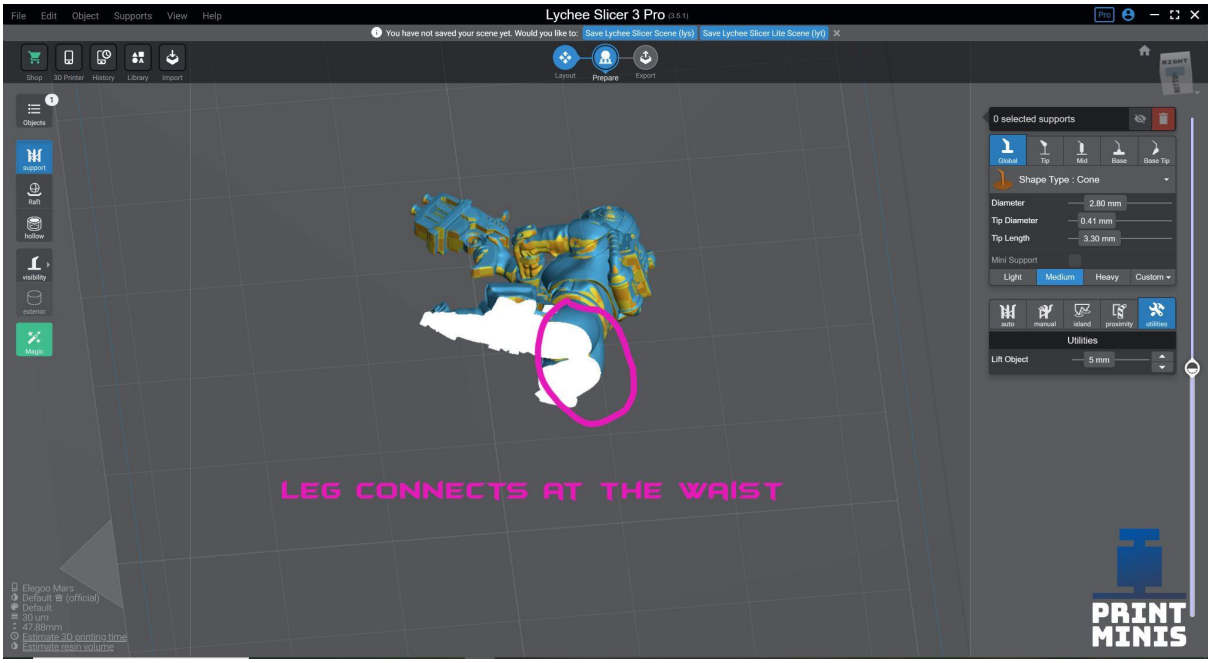


In the image above, the two white lines are the ridge detailing on Zasha's oxygen canisters. They are both islands because they start to print in free air, but they are very small and soon connect to the miniature, so they would only need a light support. Models have a lot of small islands like that.

Alternatively, the island could be where a larger section of the miniature starts to print, which doesn't connect to the main model for a while. This happens often in dynamic poses where a miniature's arm or weapon prints separately before connecting to the mini later on. In this case, that area of the miniature would need a stronger support because it has to support more resin for longer.

For example, Zasha's other leg prints for a long time on it's own, not connected to the main miniature until it reaches the waist. Therefore this island will need stronger supports than the small detail we looked at earlier. Until the second leg connects to Zasha's waist, it needs to be treated as its own individual miniature.





Why do you need to support islands?

The reason all islands need support is because without connecting them to the main structure of the miniature via the scaffolding of your supports, they will print and then remain attached to the FEP. There is nothing to attach them to the build plate to pull them off the FEP and so they remain stuck, meaning that section of the miniature isn't printed at all.

Sometimes the layers do come free from the FEP but because they are not attached to the miniature or the support scaffolding, they simply float free in the resin tank and can stick

themselves to other parts of your model. When this happens they are known as ‘dingleberries’ and they can destroy a miniature.

If you don’t support the small islands on your miniature it will still print but there will be larger areas of the detail missing, and if you miss larger islands/ islands where the miniature starts printing, then huge sections of your model might not print at all.

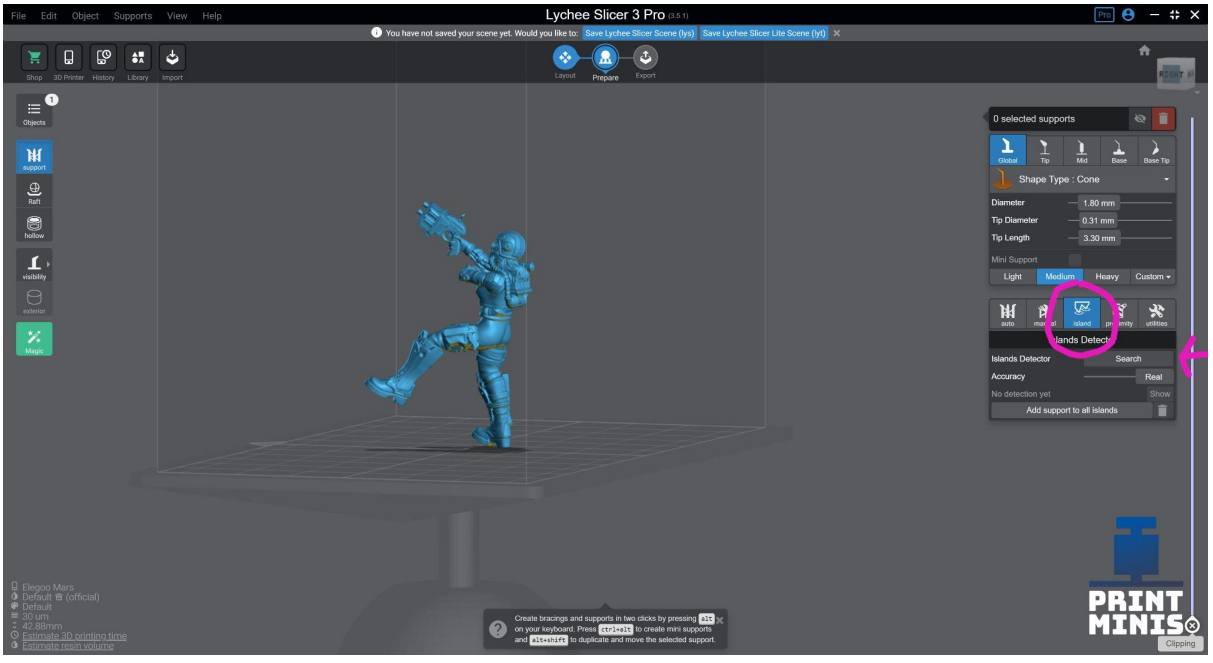
What does the Island Detector Do?

This feature in Lychee highlights all the islands on your miniature in red, which shows you all the places that you definitely need to add a support. Finding the islands yourself by using the scroll bar at the side of the screen, or running your mouse along the miniature to look at the layers, is really difficult and it’s easy to miss islands that way.

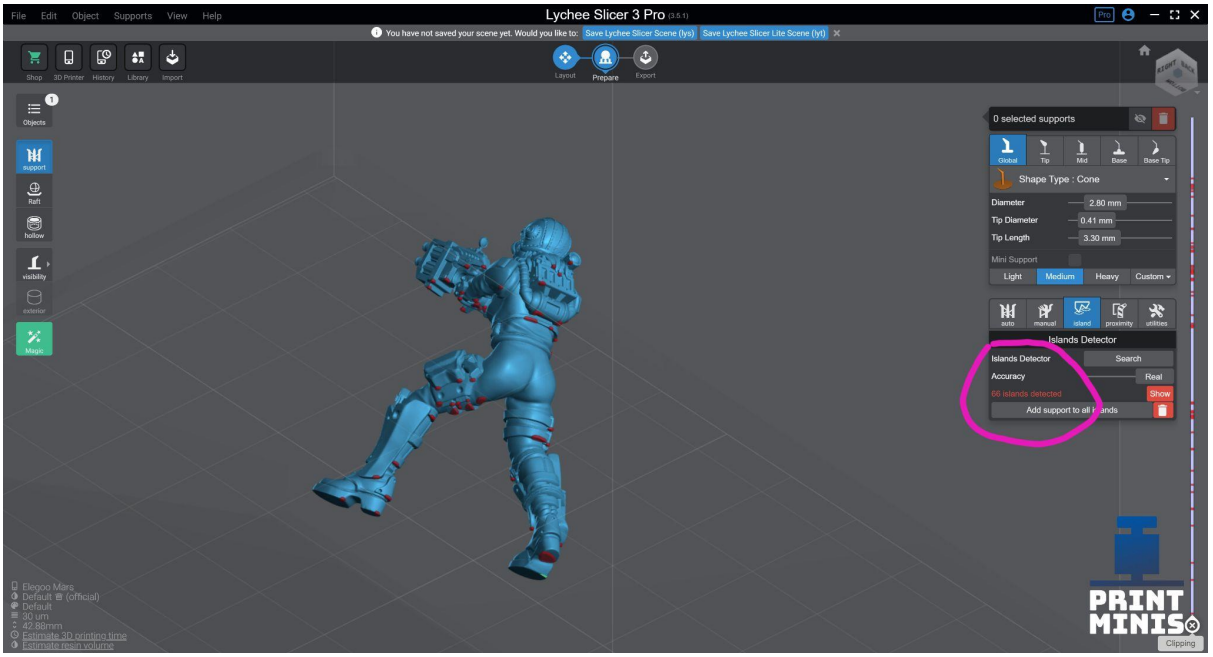
Lychee’s Island Detector shows the islands to you with a red dot, and then when you support that island, the dot disappears so you can make sure you’ve caught them all. It’s a very useful feature!

So for the last test when checking the orientation I’ve picked for my miniature is to run an island detection, and see how many there are.

On the small menu, select the Island tab, make sure the Accuracy bar is on Real, and then click search. This will take a few minutes so just wait for Lychee to finish its search.

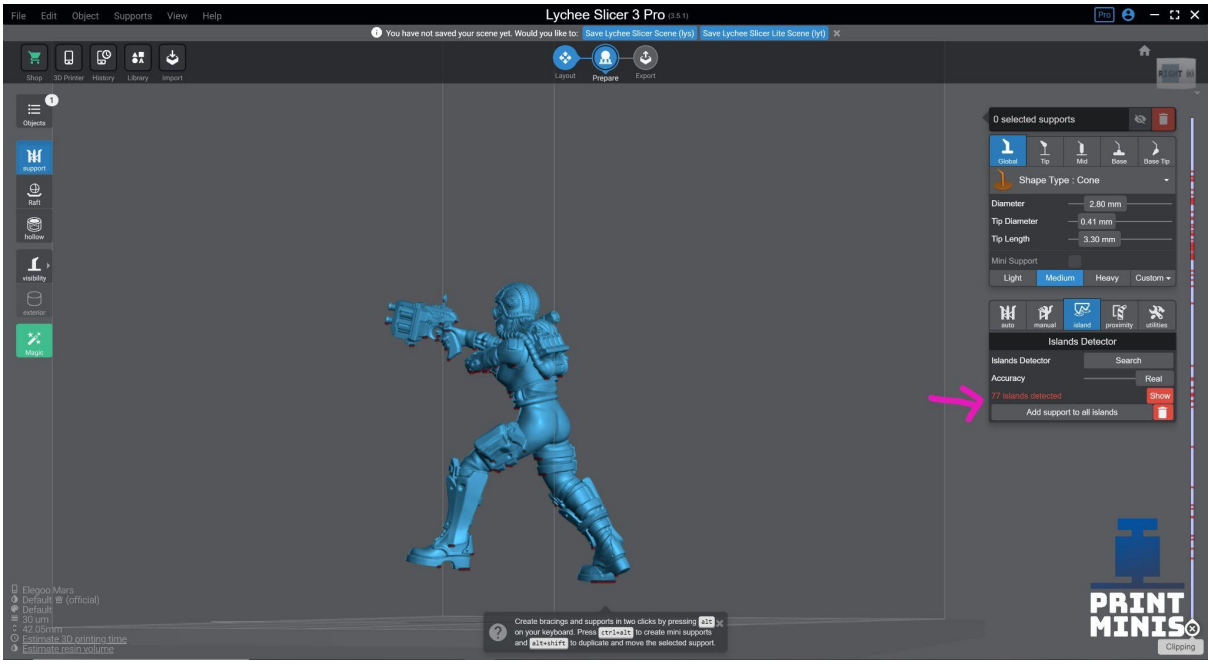


At the -25 degree rotation I picked, there are 66 islands for Zasha.



You can see the islands in red on the miniature, as well as listed on the smaller menu, and also denoted on the white scroll bar along the side of the screen.

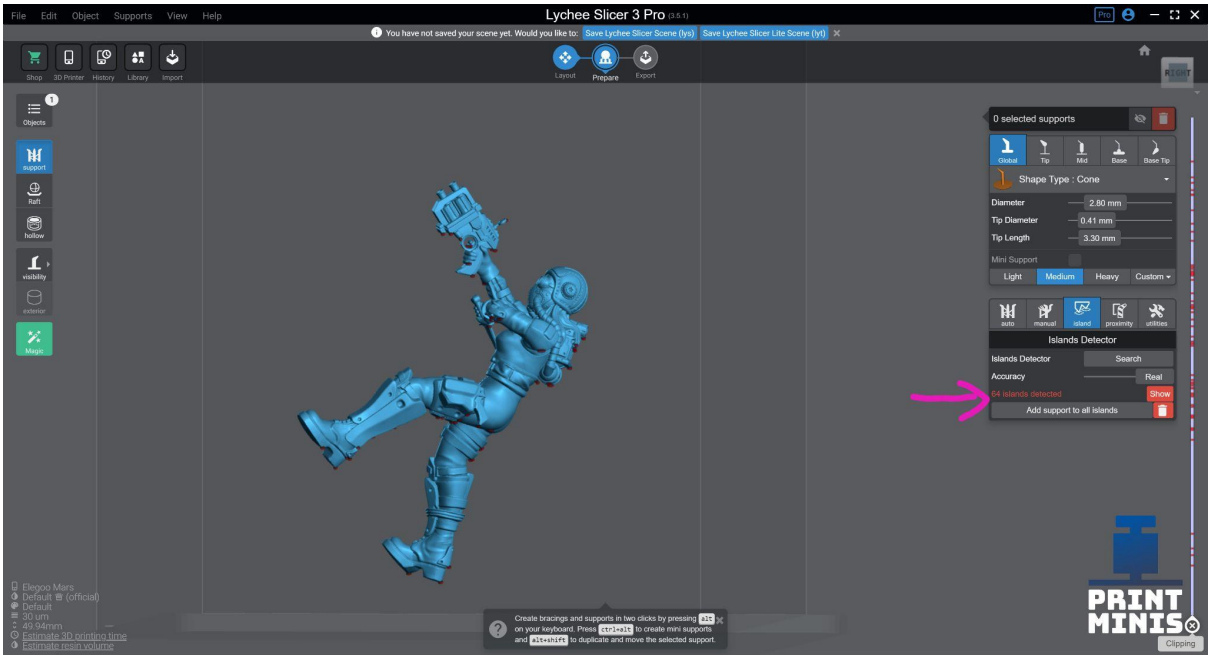
To know if my -25 degree orientation is acceptable, I will then try a couple of others that I have in mind and compare the island number. For example, printing Zasha straight has 77 islands.



This is significantly more than the previous orientation, and so it is out of the running as an option. Every island means an extra support and so it's generally better to aim for less.

Another orientation would be at a -45 degree rotation, which shows to have 64 islands.

This is slightly less than my chosen orientation, but in my opinion it's not enough to require changing it. At this angle, reaching the knife arm on Zasha to add supports to those islands would be quite awkward. Also, more of the miniature faces the built plate and so would need additional supports (even though there are no islands there). Therefore I think sticking at the -25 degrees is the best option for Zasha.



This example shows that there is often more than one acceptable orientation for a miniature though. Either the -25 or -45 degree tilt would be perfectly fine, and so you don't need to stress too much about choosing the perfect orientation.

Summary of Orientation

As you can see, there are a lot of things you can consider when picking an orientation for your miniature and it might seem overwhelming. Please don't worry too much about it though! There are pros and cons to every orientation, and you can get good prints from many of them, so this stage isn't going to make or break your miniature.

Just take a look at your model and imagine the model printing. I'd definitely orientate delicate features like the miniature's face away from the build plate (if you can) and have long straight sections printing at an angle. But other than that, simply tilting the model back a little is usually an ideal option.

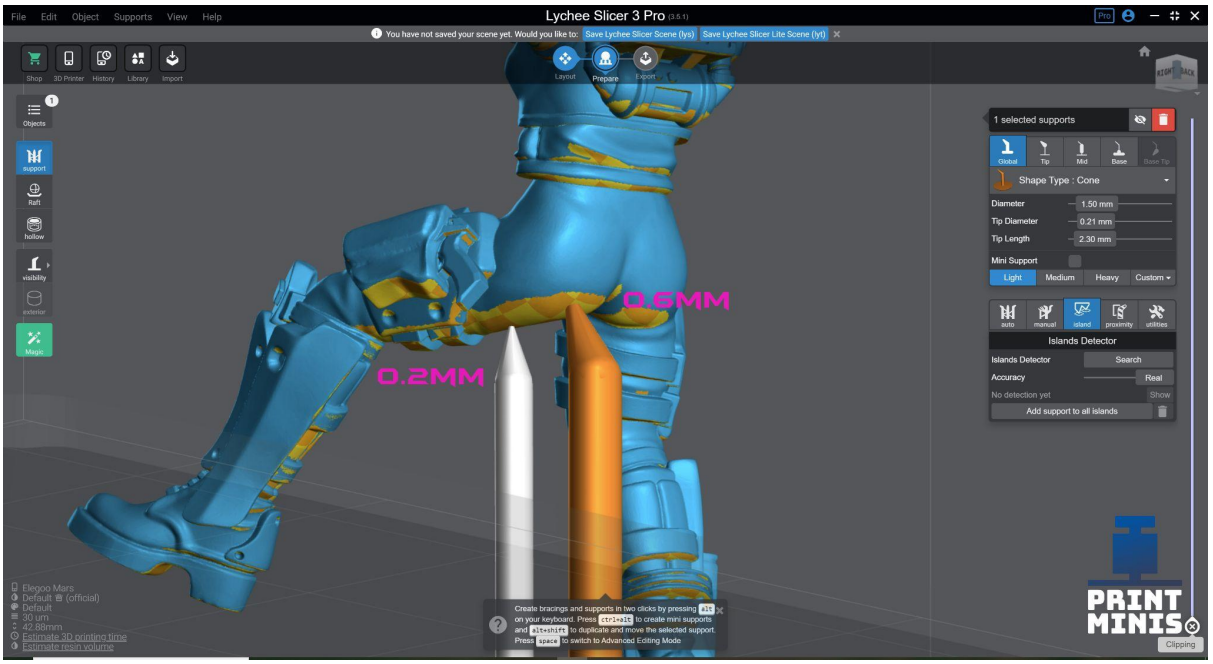
Supporting Your Miniature

Now that you've picked an orientation, it's time to add supports. There are multiple parts to a support, so let's discuss those first.

The Anatomy of a Support

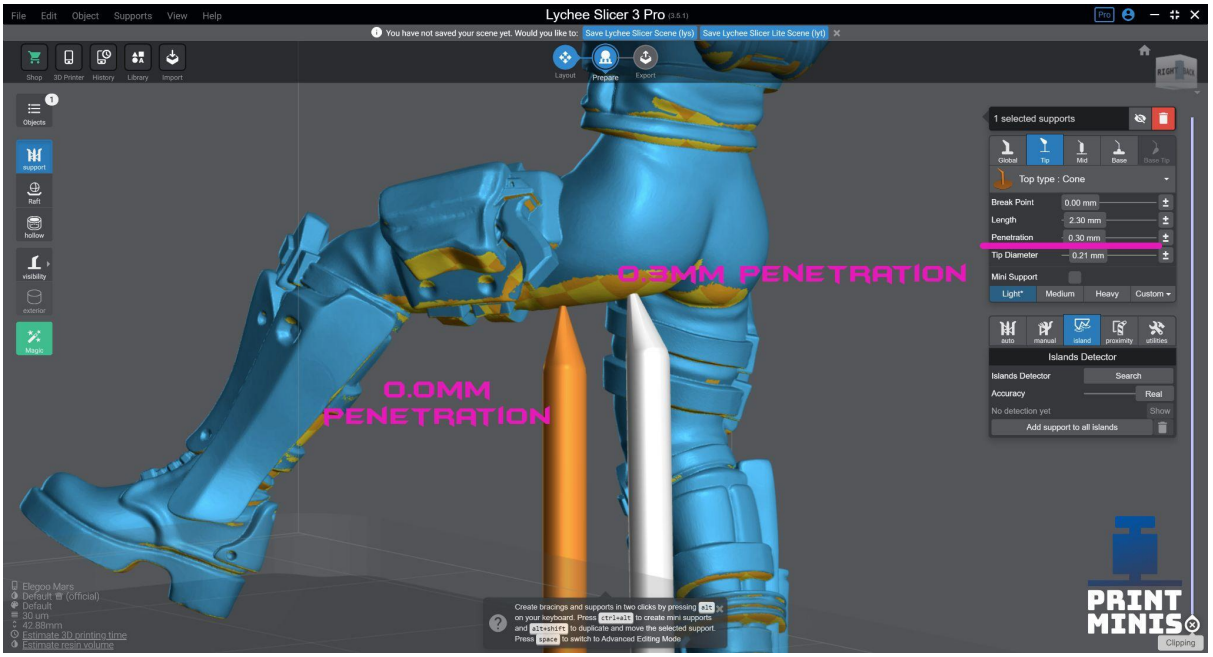
Firstly, and most importantly, is the size of the support tip. This is the size of the part that touches the miniature. It will bond to the model in order to provide support, and when you remove that support later on, it will leave a small area of damage. This damage is usually an indentation where the support tip was bonded to the model. When you remove the support, often it will take a small piece of the miniature with it, leaving a concave dip.

The smaller the support tip, the less damage it leaves behind on the miniature, but the less securely it is attached to the model. Therefore, supporting a miniature is a careful balance of support sizes to ensure the supports remain bonded to the miniature while it's printing, but cause as little damage as possible when removing them.



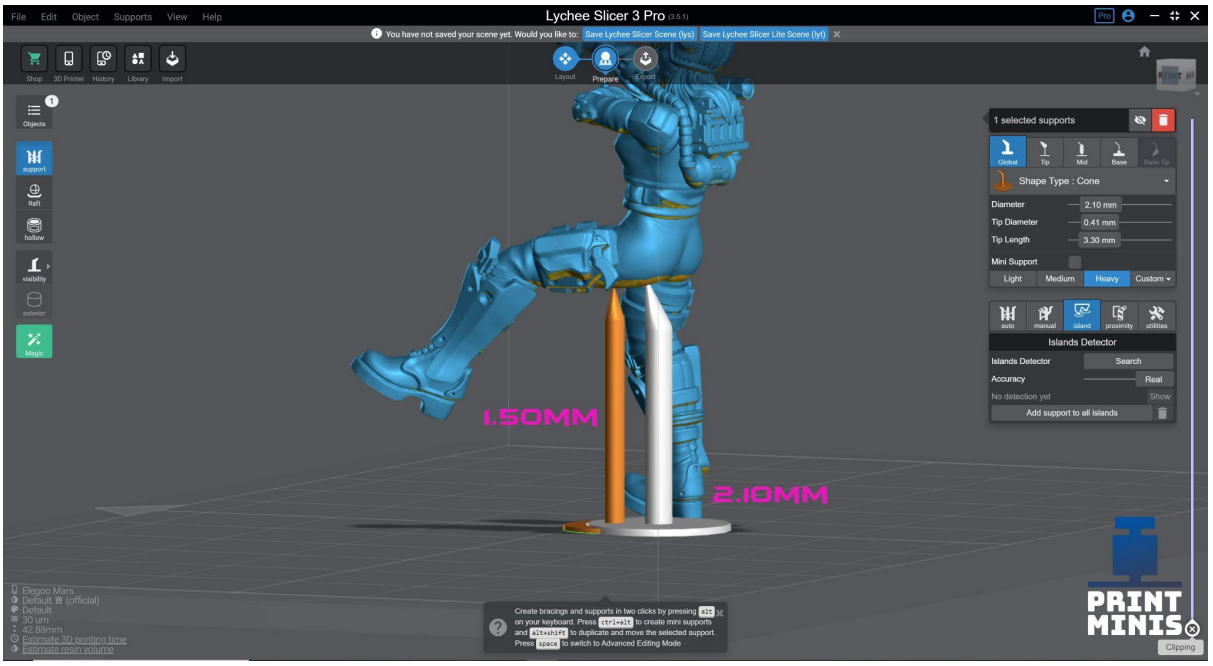
In this image, you can see a support with a tip size of 0.6mm vs a support with a tip size of 0.2mm. The heavier support tip is significantly larger and would cause a larger dent to be left behind when removed from the model.

As well as the tip size, you can also set the penetration depth, which is how deep your support tip is embedded in the miniature. You want to set this at 0.0mm, otherwise it will actually widen the amount of support in contact with your model. In the below example, you can see that both supports are 0.2mm on the tip, but one has a 0.0mm penetration depth and the other has a depth set to 0.3mm which has sunk the support into the model.



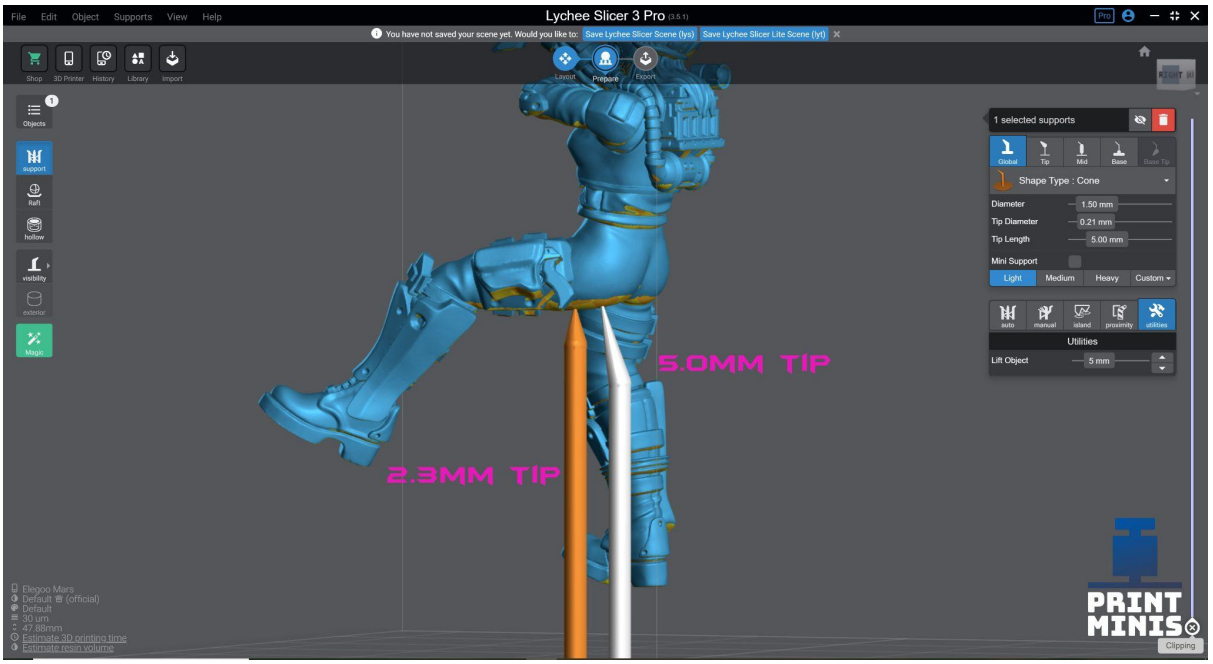
The second feature you can edit is the thickness of the support's body. If the body of the support is thicker, then it is stronger. I find that when supporting miniatures, having some supports with a thicker body is really useful for keeping the miniature stable and secure as it prints, preventing it from wobbling around. The thinner supports will support an island but will not stabilise the miniature as effectively.

However, if you were to use exclusively thick supports, then the supports would be difficult to remove from the model after printing because they're so solid. It's also a waste of resin, which is worth trying to preserve where possible. In the example picture, you can see that one support has a 0.2mm tip size and a body size of 1.50mm, whereas the other has a tip size of 0.4mm and a body of 2.1mm instead.



Therefore, when you are supporting your miniatures, it's good to use a range of supports - some with thinner bodies and smaller tips, and some with thicker bodies and larger tips. You'll see this in action as we support Zasha together very soon. Also, it's worth noting that for larger miniatures such as big terrain pieces, you'll need even thicker supports with larger tips than what we'll use today for our character, Zasha.

Other editable parts of the supports are the tip length. I personally don't use long tips on my supports, however, you will often see them on other supported models. Since I don't use that method, I won't talk about it much here, but once you're more familiar with supporting, you can try out different tip lengths. In the example picture, you can see that we now have two supports with a tip size of 0.2mm on the miniature. This time I have edited the tip length so one support has a length of 2.3mm and the other has a length of 5mm.



Finally, you can also edit a few other support settings, such as the size of the base or the shape of the tip (in our examples, it is a cone shape), but I don't edit any of those standard settings when supporting, so it isn't worth looking at them in this article.

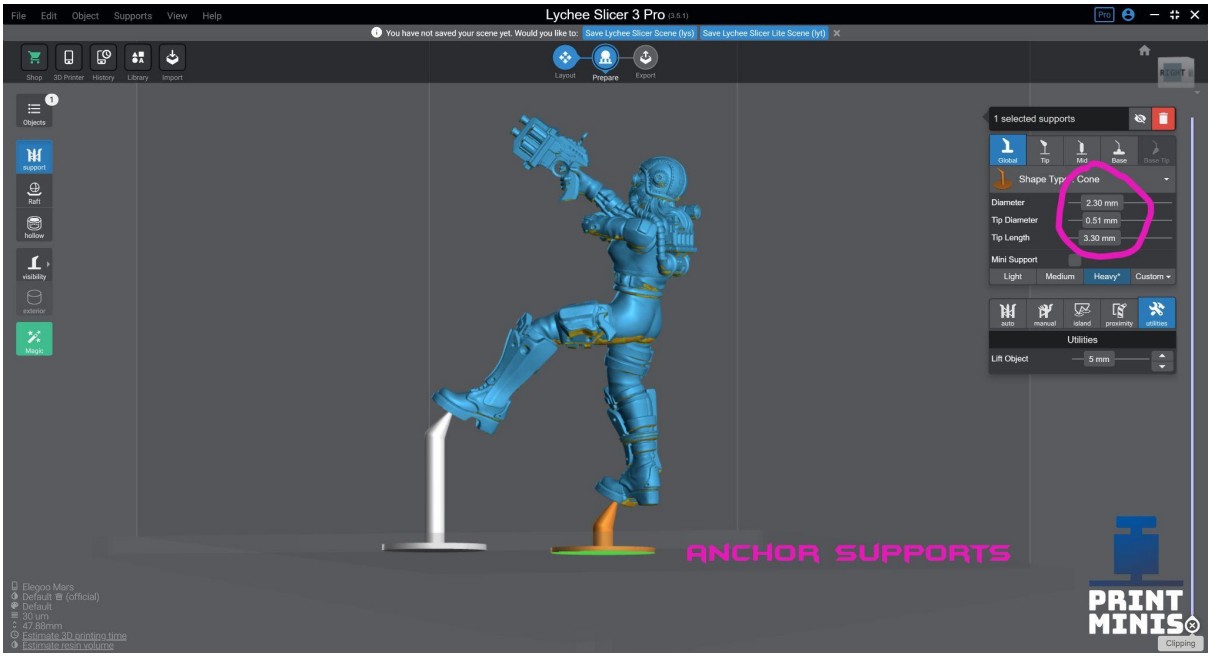
Supporting Zasha

Step 1 - Anchor Supports

The first thing I do when supporting a miniature is to place heavy anchor supports on it. This is 1-3 larger supports which have the thickest support tip you'll use on the model. They will serve to anchor the miniature to the build plate, ensuring it does not detach from the supports while printing.

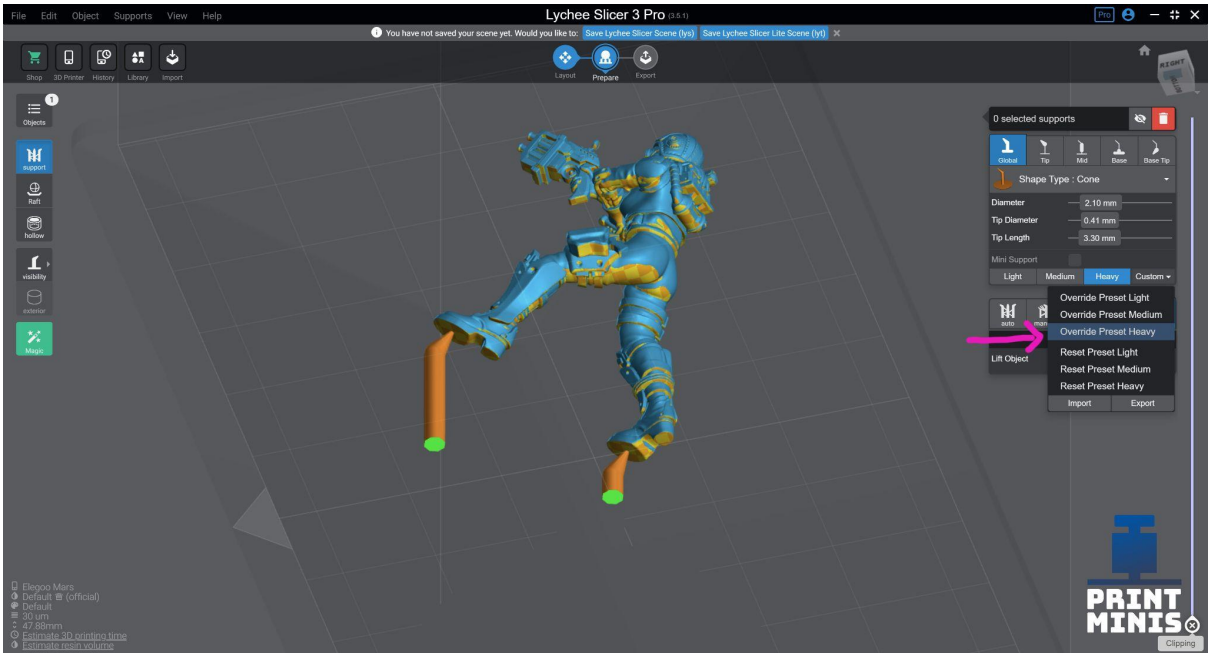
The size of this support will depend on the size of your model, but for characters, I use a support with a 0.5mm tip and a body thickness of 2.3mm. When placing these supports, you

need to choose areas of the miniature that print early on and will not show the damage from a larger support tip. Also, a larger space is ideal so the support damage left behind won't impact any detail. For Zasha (and most other characters), I place the anchor supports on their feet in the centre of the largest part.

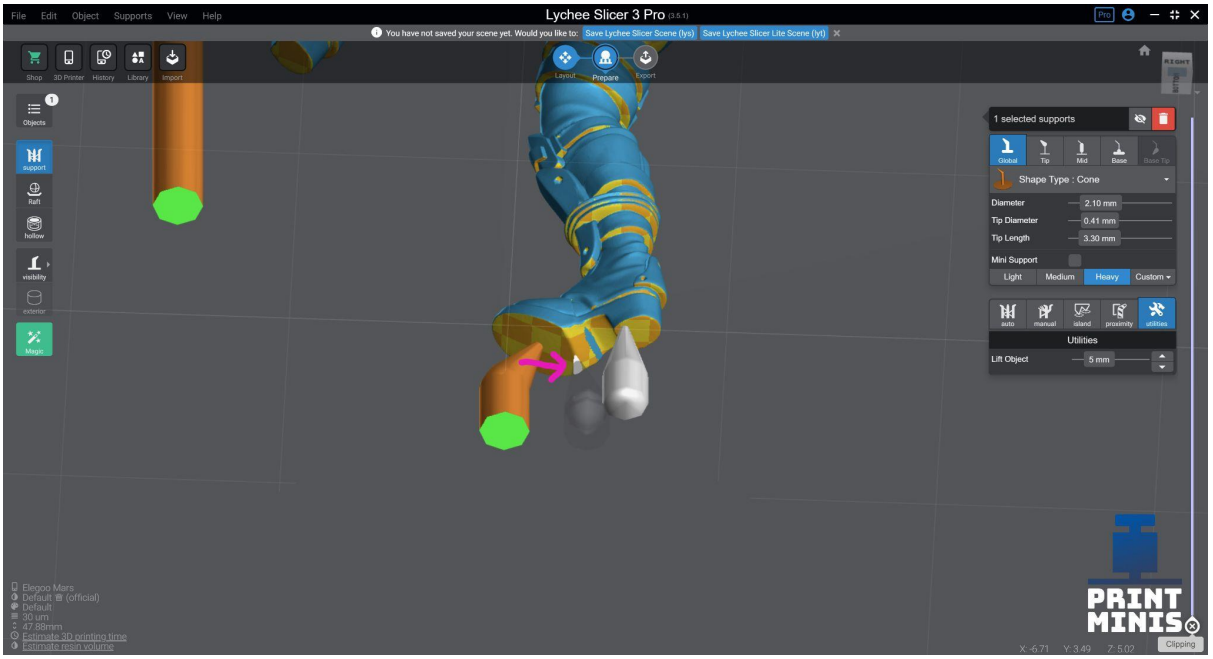


Step 2 - Apply Your Heavy Supports

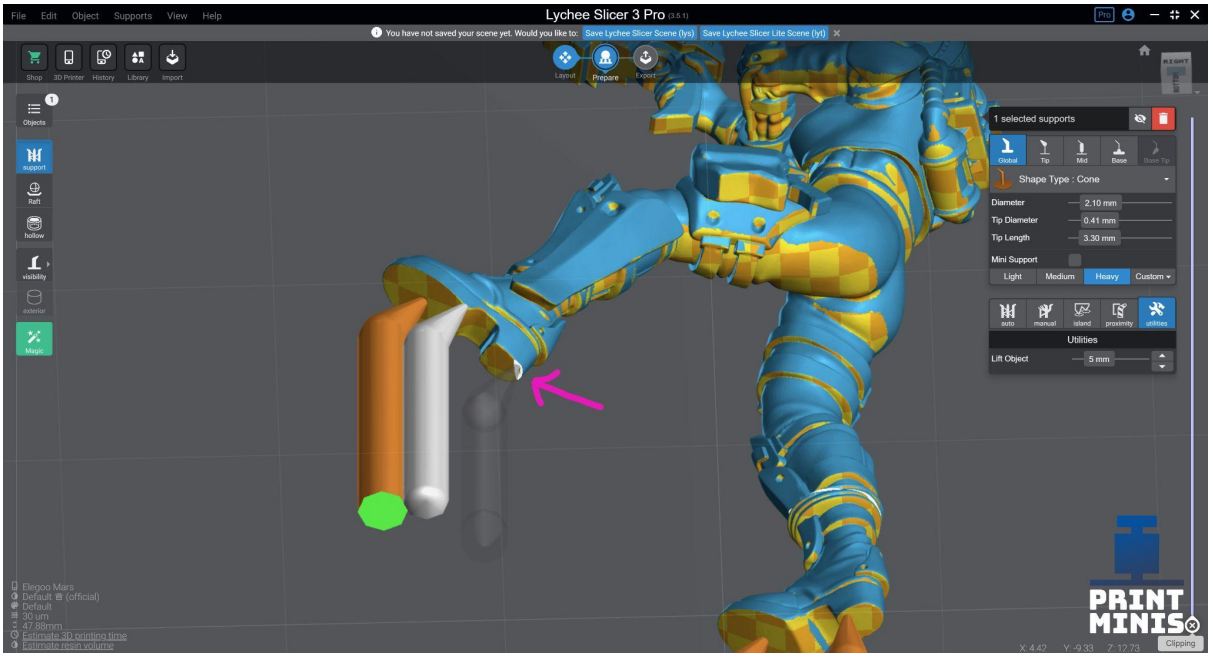
With two anchor supports in place, I moved on to my normal heavy supports. For characters, these are set at a 0.4mm tip and a body thickness of 2.1mm. You can edit your heavy support settings to reflect these by clicking the Heavy Tab on the upper support menu (remembering to also set the penetration depth to 0.0mm). Then if you click on the Custom option, you'll be given the choice to 'Override Preset Heavy' to save those settings. I'd recommend doing this so you can quickly tab between the Light, Medium and Heavy support menus without losing your character support settings.



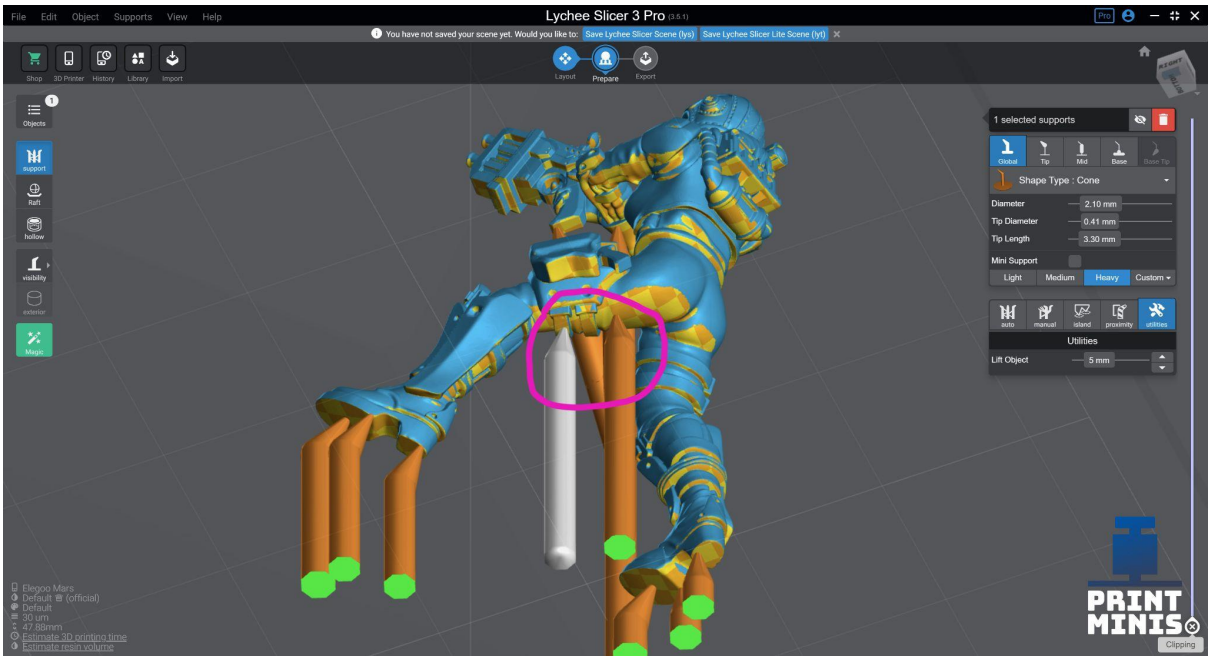
When placing my heavy supports, I try to place them around the model on larger areas that I'd like to offer some stability to, or areas of the miniature that print on their own for a while and I want to ensure they don't fail. With Zasha, I would place a heavy support in the following areas:



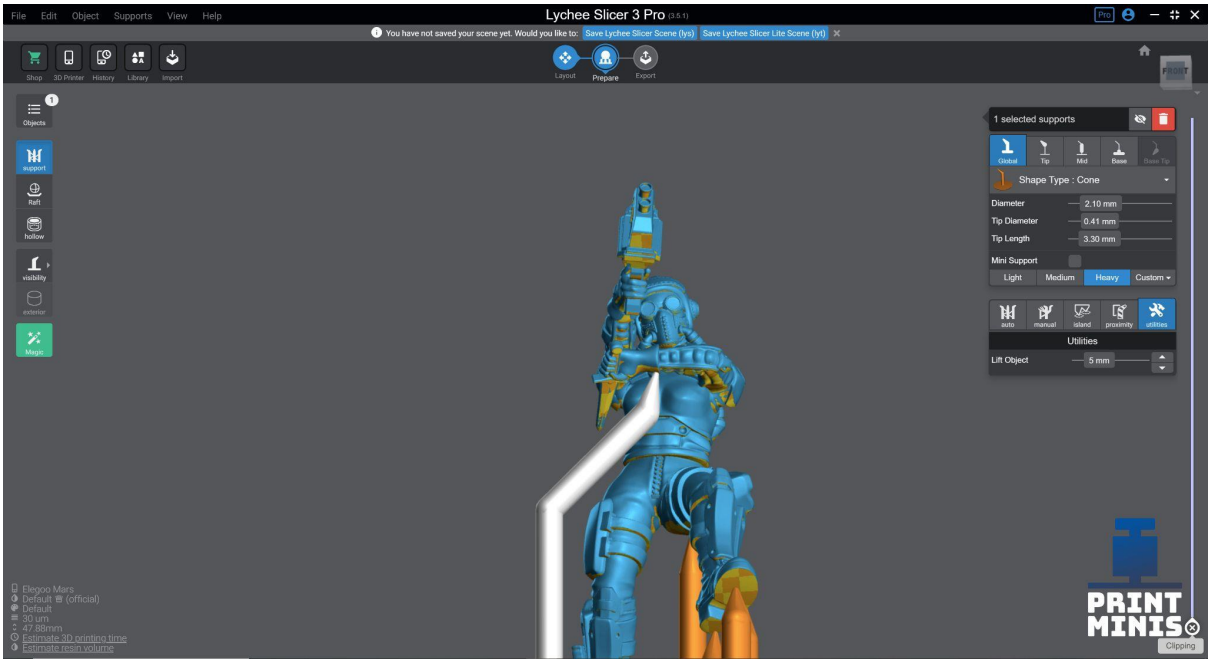
In the above image, you can see two heavy supports on her first foot at the points where the foot starts printing. You can see in the image that if I hover my mouse over the miniature, there is a ghostly support outline and the layer that's printing on the model is highlighted in white. You can tell by doing this that the foot starts printing on that edge and so I placed a support there.



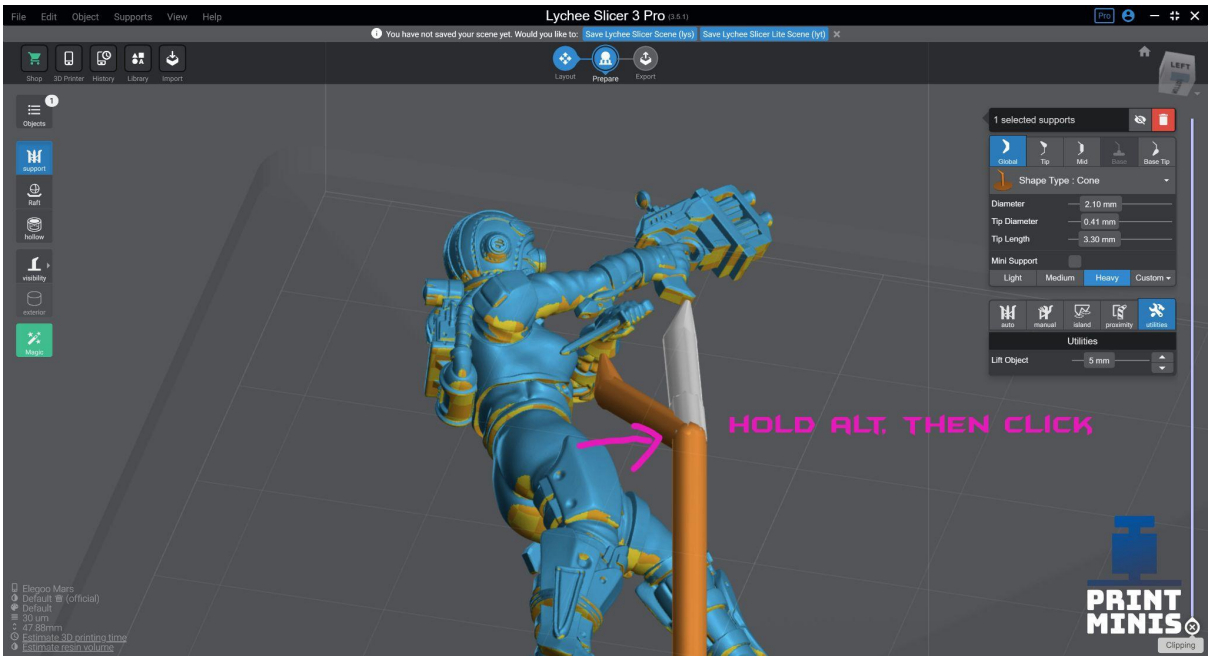
I then placed two more heavy supports on the other foot. I like to add heavy supports to a miniature's feet if they're printing first (or early on) because you won't see the support damage on the finished model.



Next I placed two heavy supports on the thigh because it's a large area, and it is also about halfway up the model so it's a good place to have thicker supports since they will offer extra stability as the rest of the miniature prints. I've placed each of them on an island as well (found by hovering my mouse over the miniature).



In the above image, you can see the bent arm starts printing separately from the rest of Zasha's body and so it's good to give that area a heavier support to safeguard it against failing. The bent arm also joins with the straight arm around the location I've added the support so the heavy support will help to stabilise the area further.



My final heavy support was added to the handle of the gun to secure the weapon as it prints.

You'll also notice in the image that I've attached the heavy support onto the one from the arm. I've done this because the two support bodies were in a similar place, and so by combining them I save resin, keep the miniature's supports neater (which makes the whole supporting process easier) and also make the supports easier to remove later on.

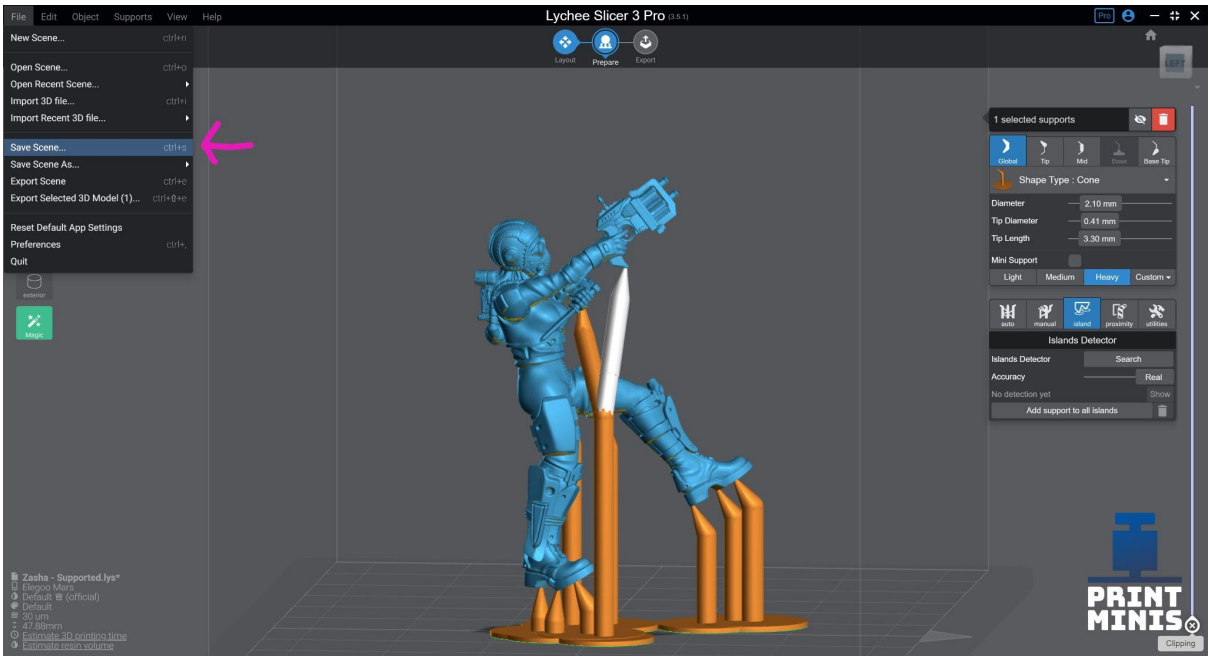
To attach one support to another, instead of allowing it to travel down to the ground, simply press and hold Alt and click to attach your support tip to the miniature and then click again to attach the support end. The control will automatically shift from the support tip to the support base when you've attached the tip. Keep holding Alt until the support is finished.

You can attach the support base to another support (as I have done) or to the miniature, where the base will become another tip that mirrors the top settings (so in the case of a heavy support, the base tip would also be 0.4mm).

Save Your Miniature!

It's usually at this point that I save my miniature since the next step can cause crashes because it is very intensive. You can do it straight away though if you prefer and then save the file again before the next step.

To save, head to File in the top left hand corner, and then Save Scene.



Step 3 - Run the Island Detector

At this point, I run the island detector. Once the miniature is showing islands, the orange & yellow checkerboard is removed, which is why I like to add the heavy supports first. I use the checkerboard to judge where there will be a lot of suction pressure on the miniature (like on her thigh) and therefore which locations would benefit from the stability of a heavy support.

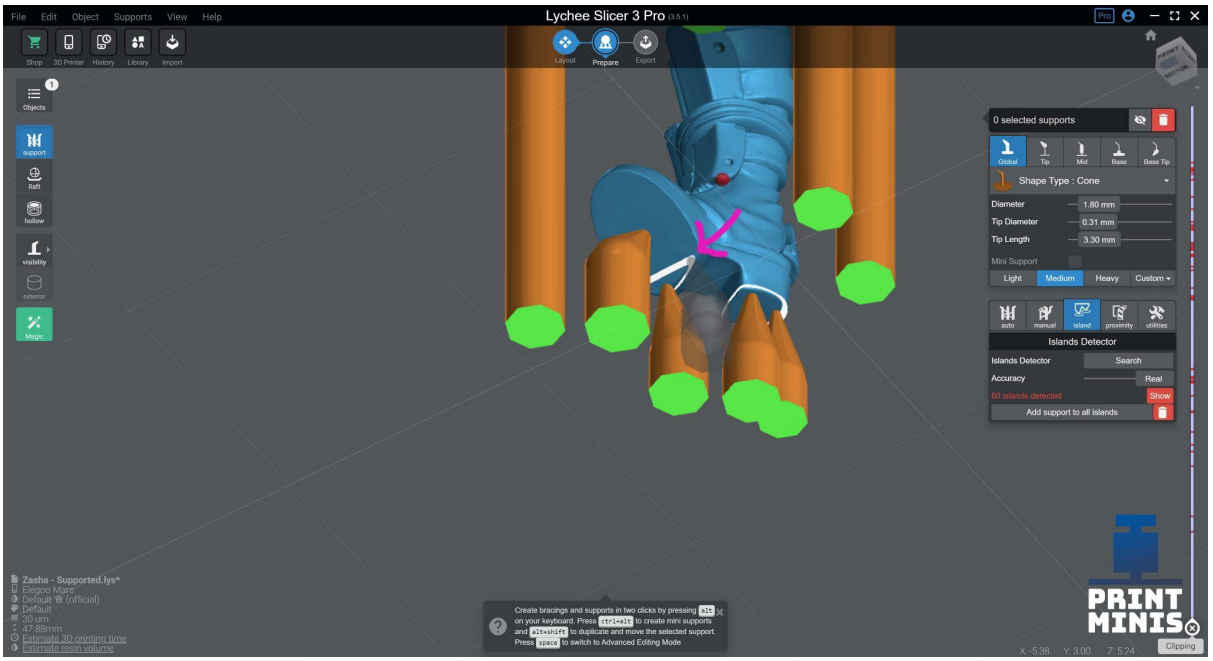
Now that we've added our anchor and heavy supports, the main task is to support all the islands. Head to the Island tab on the smaller menu, ensure the Accuracy is set to Real, and

then click to Search (just like we did in our example earlier). Zasha now has 60 islands since we've supported some of them with heavy supports.

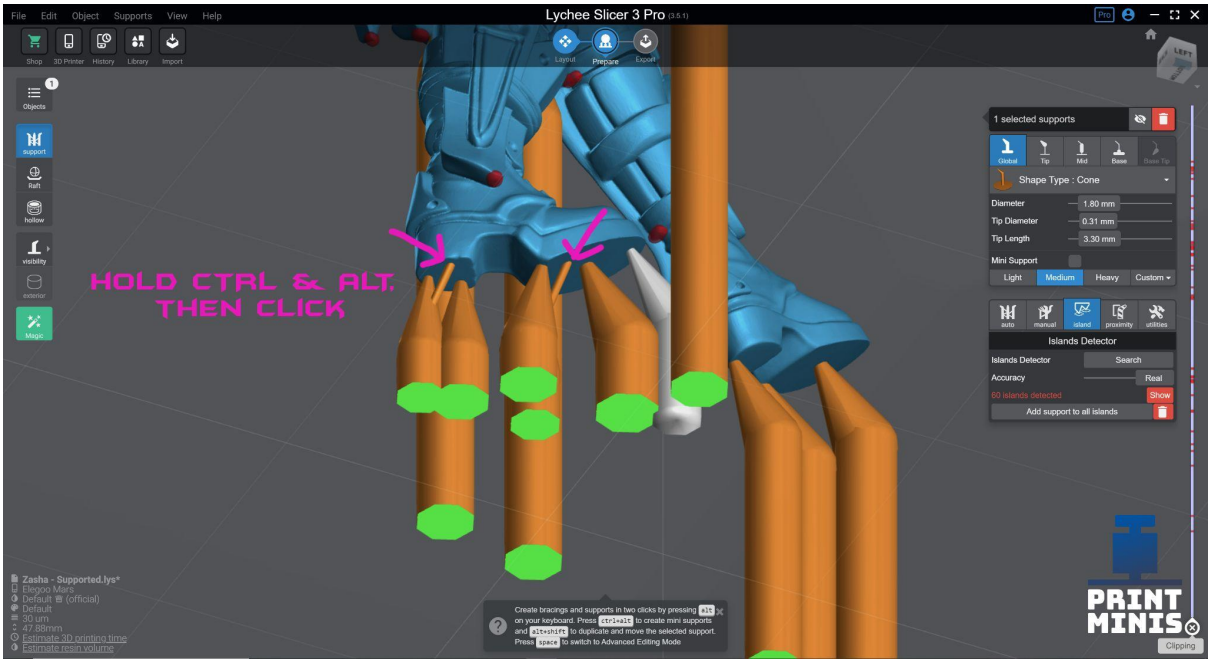
Step 4 - Apply Your Medium & Light Supports

When applying supports from this stage onwards, I generally start at the bottom of the miniature. This is because as you add more supports, the model will get crowded which makes it harder to see the bottom of the miniature.

My medium supports have a support tip thickness of 0.3mm and a body thickness of 1.8mm.



Starting with the foot that prints first, I added a medium support to the heel at the back and another to the shoe ridge. You can see in the image that if I hover over the ridge area, the white outline shows the layer that's printing. If you imagine this layer as a wide triangle of resin only supported in the centre, it makes sense to add a support on the edge of the triangle to ensure it prints properly.

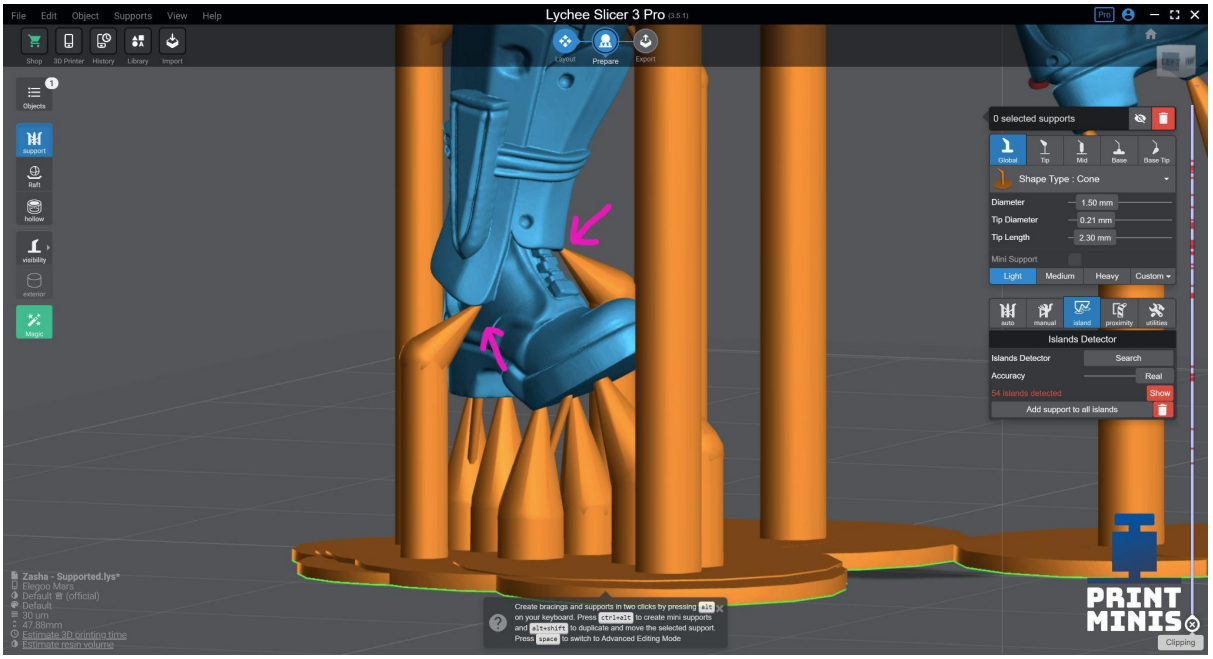


Moving our perspective to the other side of the foot by right clicking with the mouse and rotating, you can see I've added mini supports in two more areas. The first is on the heel to ensure the whole shape is supported, and the second is for the other side of the ridge triangle we looked at before. I chose to do a mini support because I felt the shoe area would become really crowded with more support bodies clipping into each other.

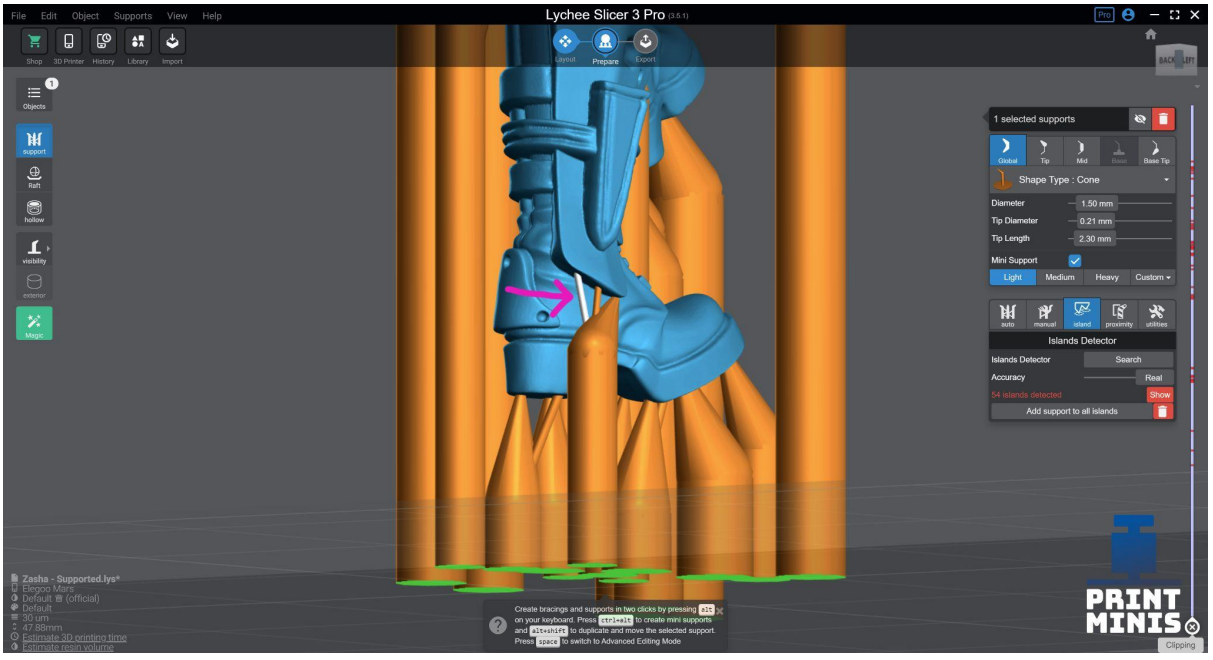
To do a mini support, press and hold down CTRL & ALT while you add a support. In this situation when you click to place the support tip and base, it will be for a mini support. With this command, you can attach a mini support to either the miniature itself or another support.

On the leg image above, you can see some islands on the smaller details, like the leg armour plates. These are very small and so they do not need a medium support. In this case, I would tab over to a light support. Remember to go to Custom --> Override Preset Medium before doing this so you don't lose your settings. You don't have to do this every time, as Lychee will retain your support presets, you're only doing this now to keep my support settings (if you want to).

For light supports, I use 0.2mm tips and 1.5mm bodies. Add those to the islands on Zasha's leg.

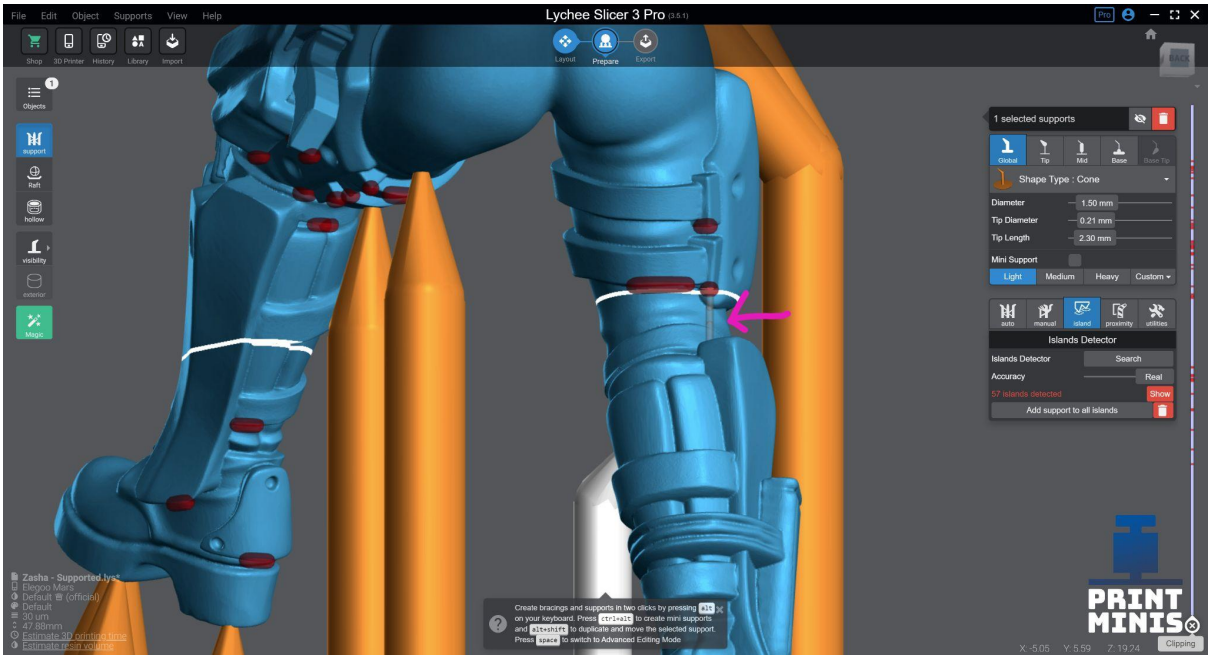


In this image, you can see I'm simply adding light supports to the detected islands. I will also sometimes add mini supports to reinforce certain areas where a small detail is a little larger, as in the example picture below. The mini supports aren't supporting an island, but they are providing stability to a detail as it prints to ensure it doesn't deform.

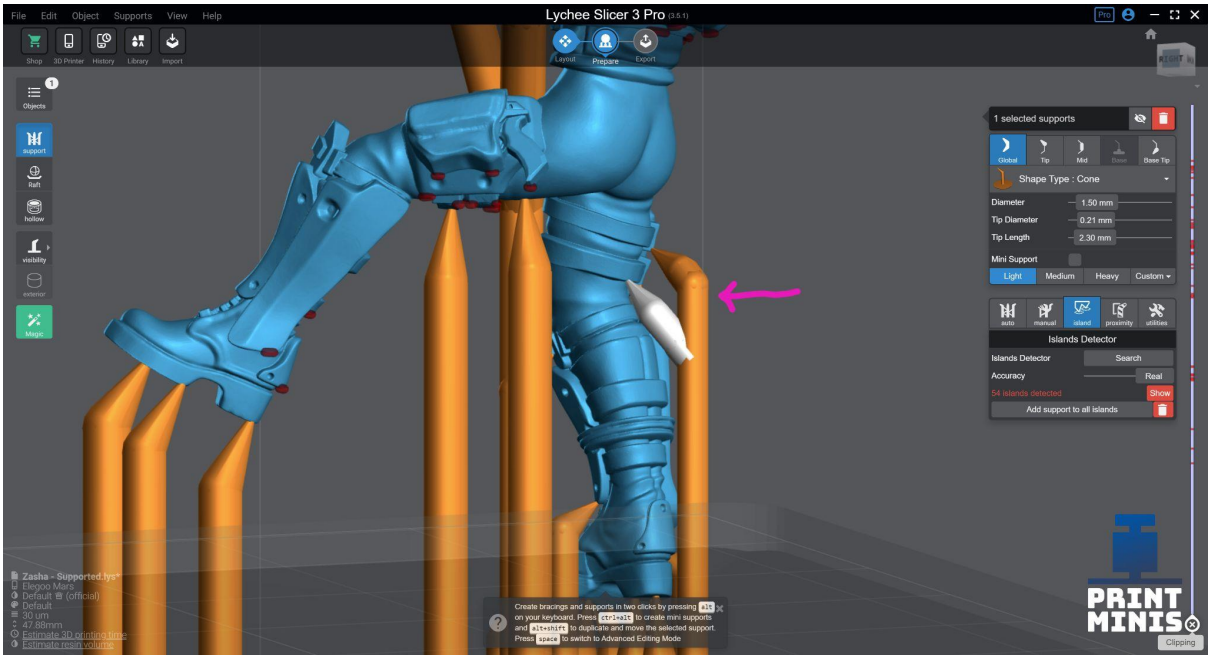


The supports I've chosen to add aren't specifically necessary, but I like to add them just in case, and with them being light supports, they will not add any significant damage to the miniature. You can make your own decision about specifics like that as you support more miniatures and develop a preferred technique.

With this next image example, you can see that as I was placing a light support on an island on the belt detail, Lychee automatically switched it to a mini support. I haven't pressed CNTL & ALT to do this, it is system generated because it's the best option for that tight area.

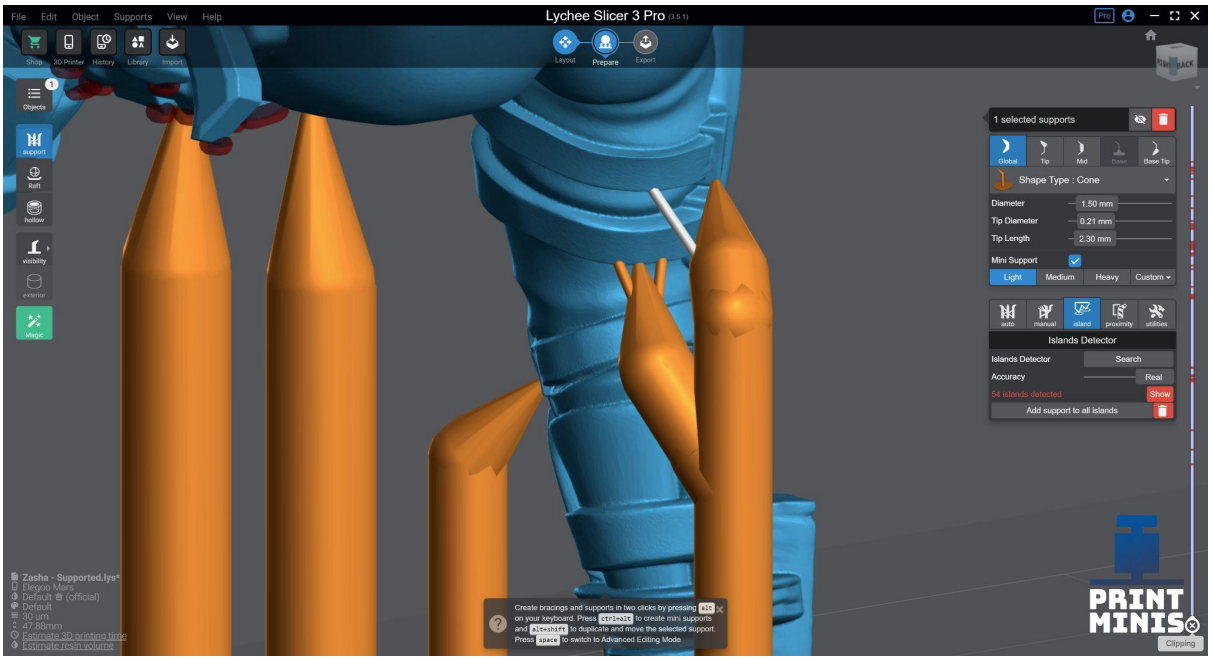


In that location, I have also added light supports to the other two islands, starting with the upper one on the belt and then attaching the lower support to the body of the upper one for neatness.



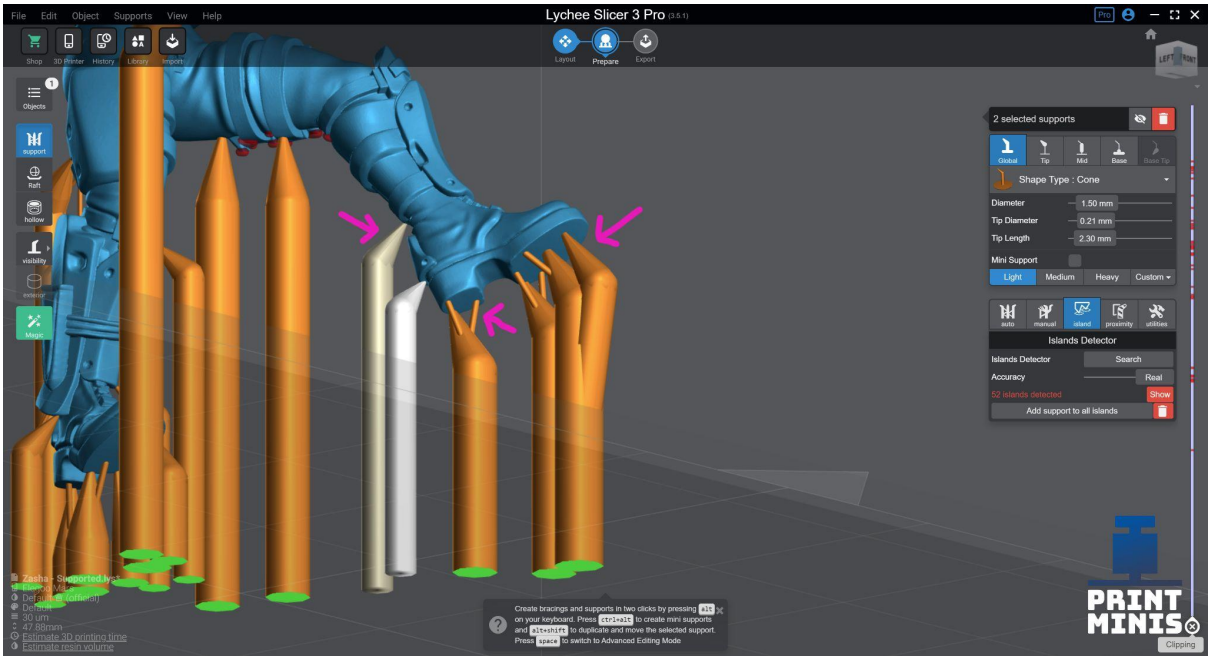
Finally, if you look at the previous image, you'll see the island on the lower belt shows up as a red line instead of a red dot. This is because it prints as a thin section and so it will help to preserve more detail if I add mini supports coming off the central support, just to help fully

support the narrow island. I've also added a mini support going to the other belt, even though it wasn't an island as I felt it would be better.

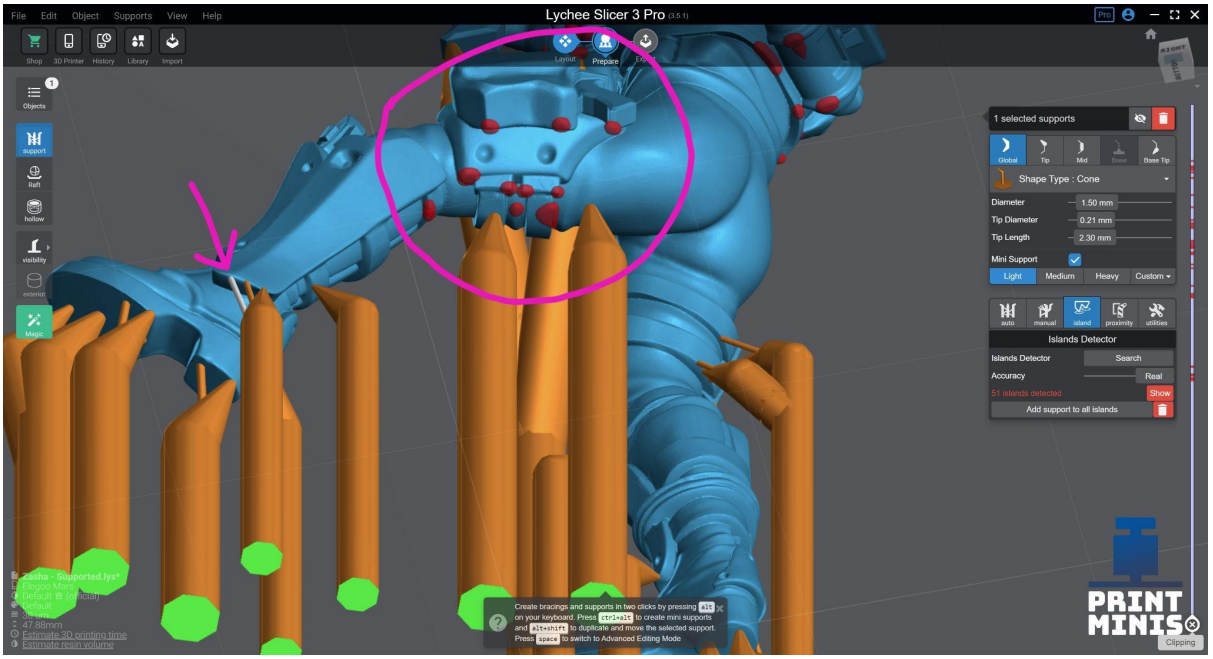


Now we can support the rest of the miniature in this way, alternating between medium supports for the larger details and light supports for the smaller details, as well as interspersing mini supports to keep everything neater.

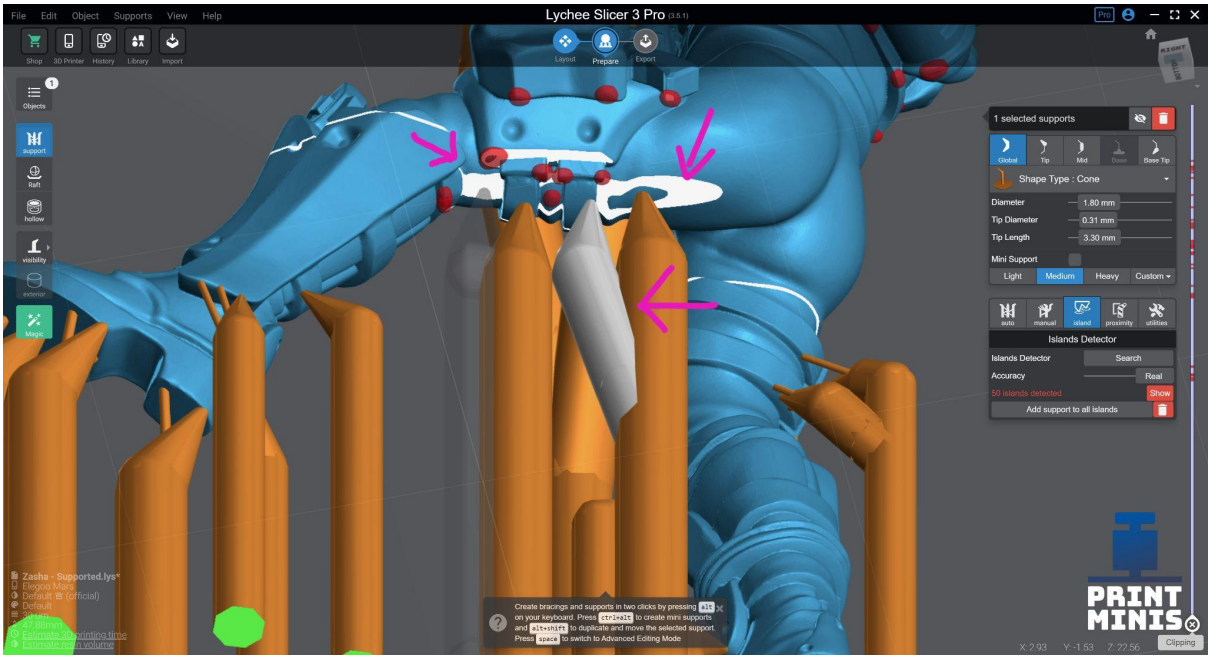
For the raised foot, I added mostly 0.3mm mini supports to the heel and shoe ridge, and then a whole support to the end of the foot. This support is clipped into the heavier one, which is fine. In the example image, you can also see I have two light supports going to the details on the back of the leg, which were islands.



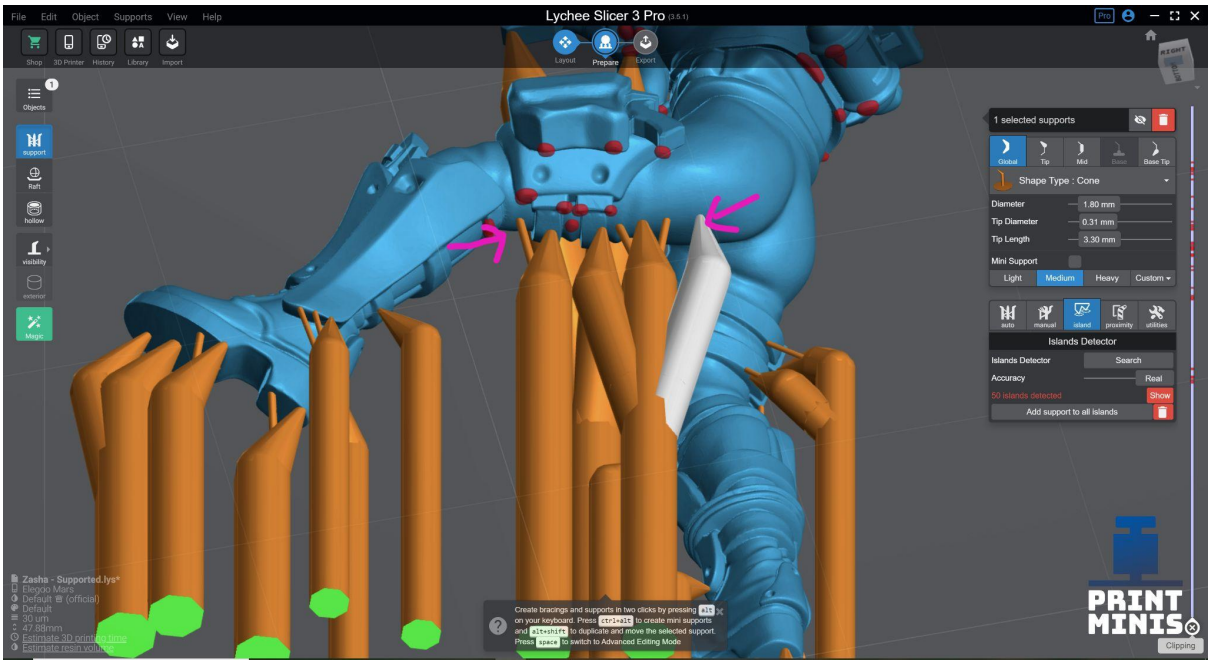
In this next image of the thigh, you can see I added light supports to the calf armour. There are then ten islands to support on the thigh, which I will do with a mix of medium and light supports.



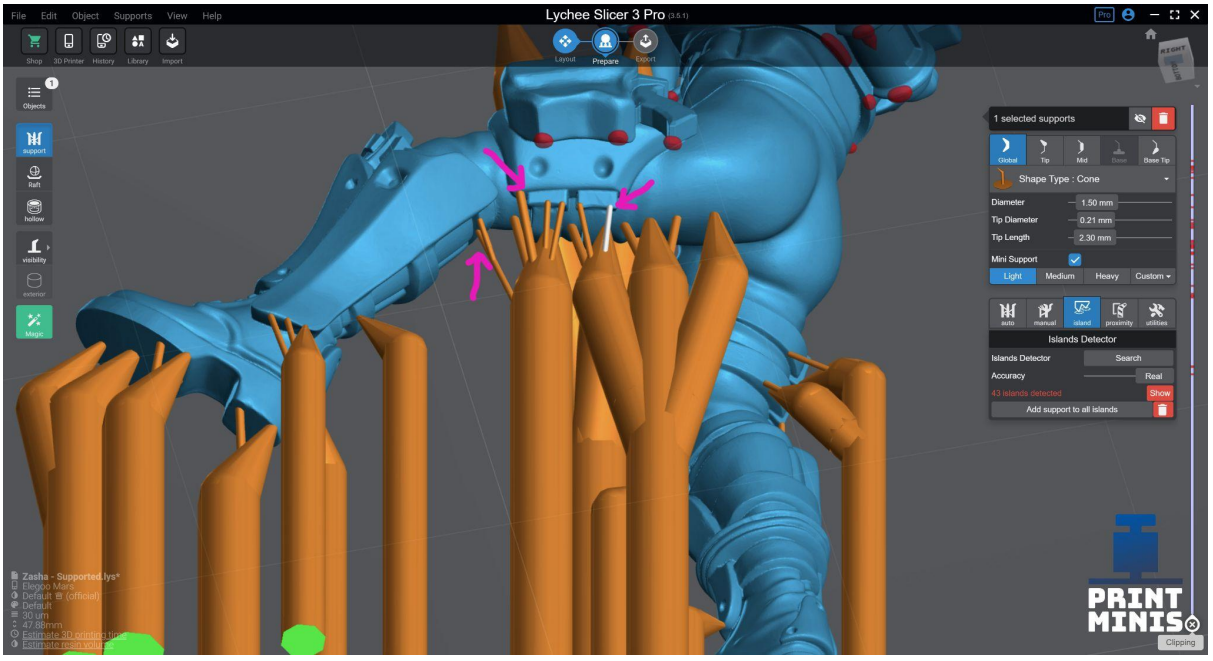
I started with a medium support on the larger island on her thigh strap, which I attached to the heavy support next to it. In the image, you can also see that as I hover my mouse over the thigh area, even though much of the area is not an island, large parts do print all at once (the white print layer is highlighted).

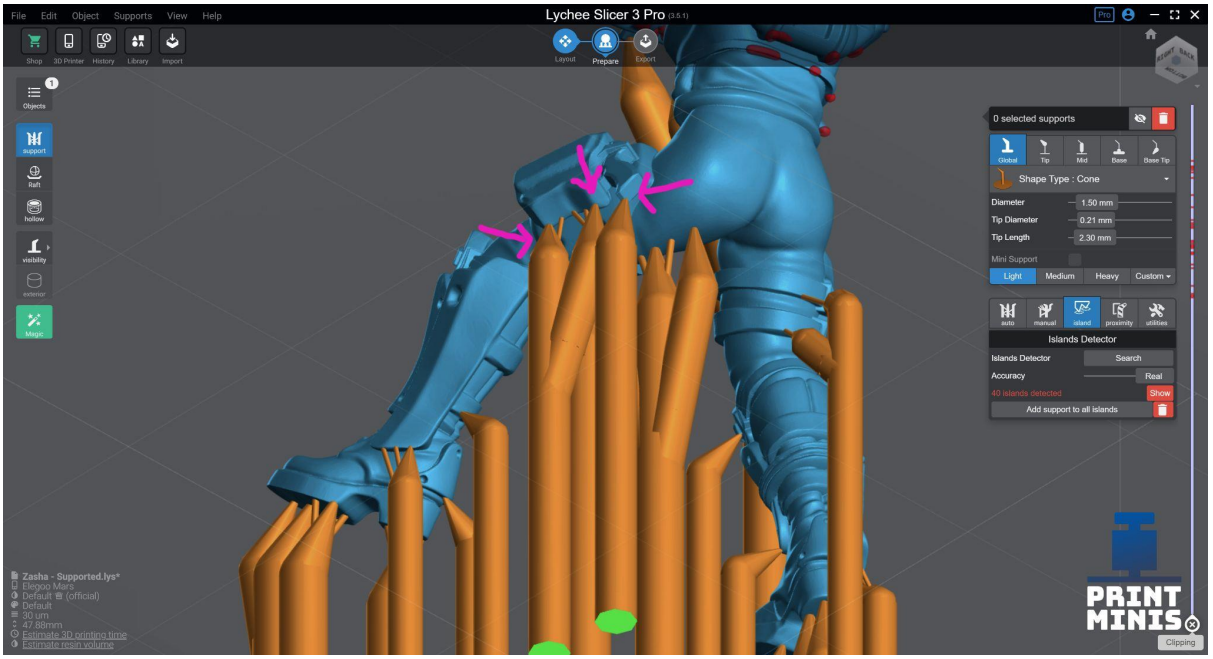


Therefore, I also added mini supports along that location to help preserve the thigh shape and give it stability.

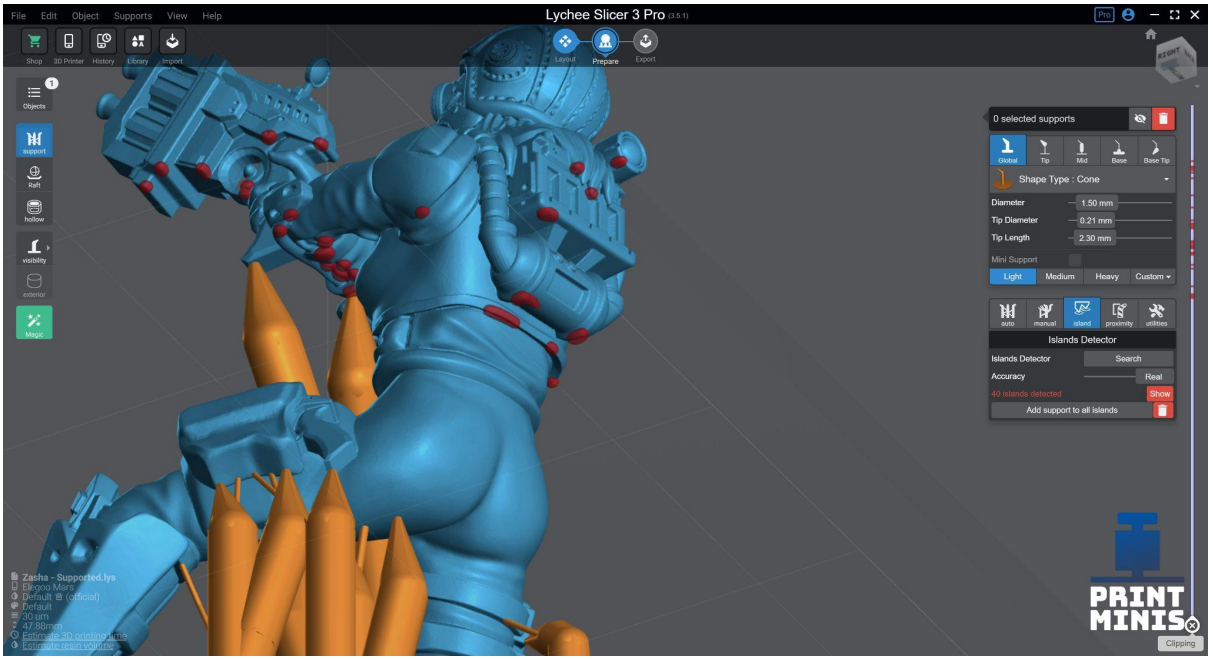


For the other islands, I did a mix of medium and light supports as you can see in the images below. Every island was given a support and then sometimes another support or two were added to the surrounding area depending on what the white highlights showed me was printing all at once.



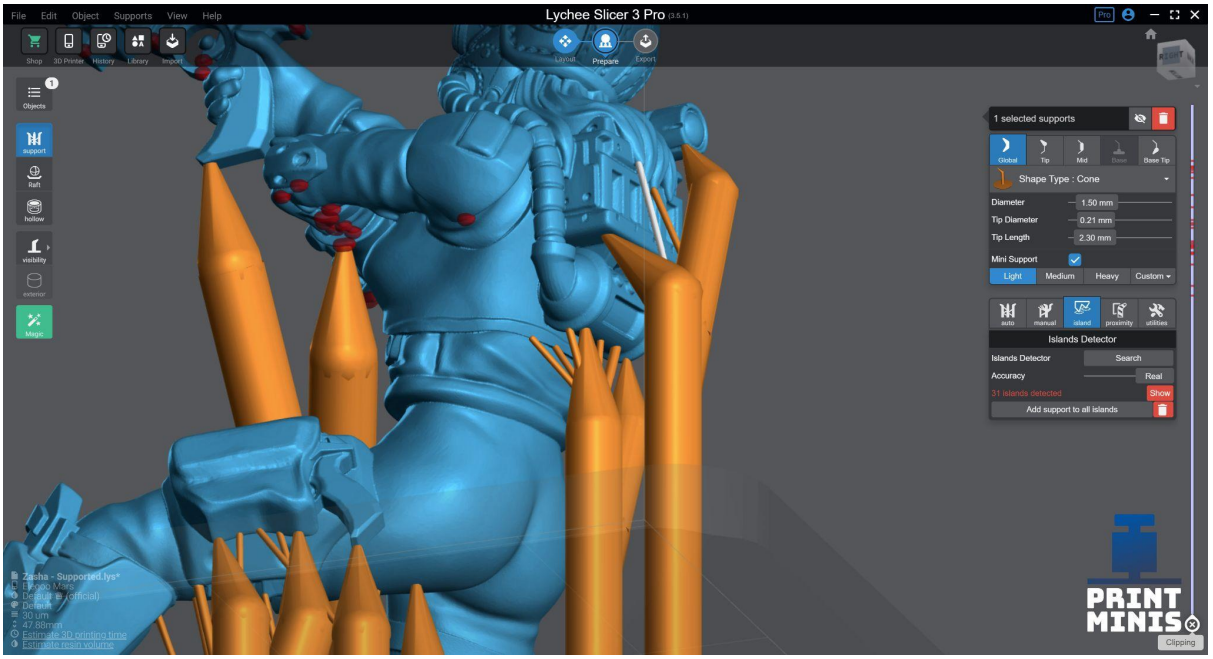


Now let's look at the back of Zasha. Below is a before shot.

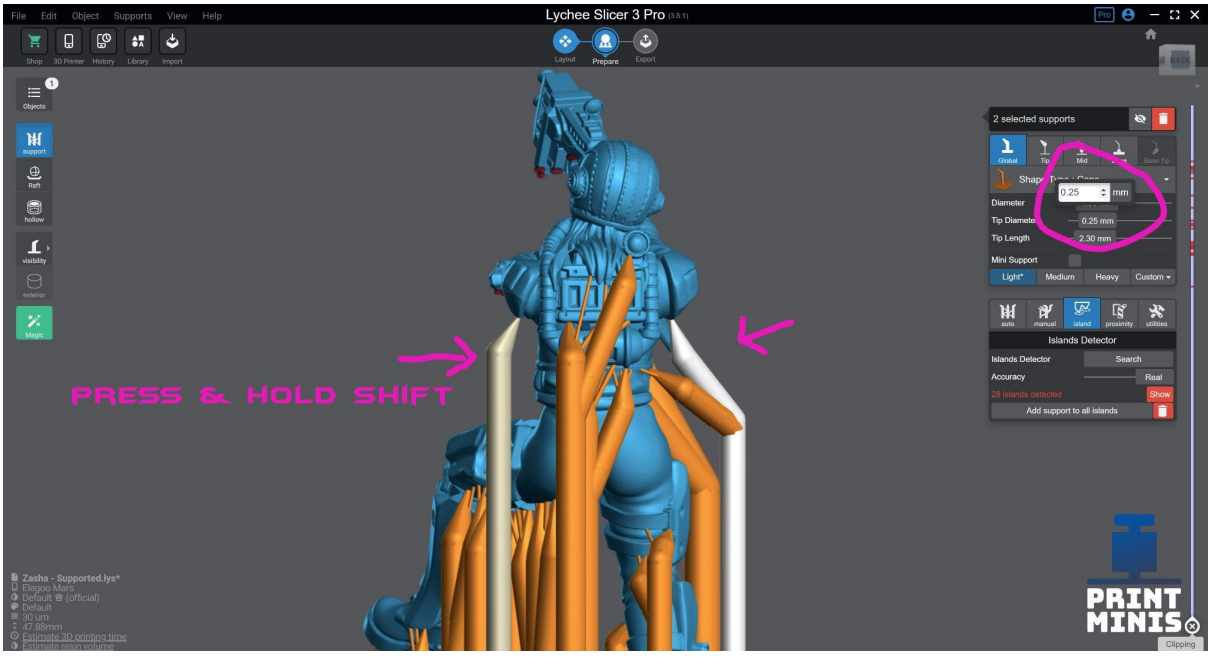


The base of the jacket prints as a thin line, and so it's important to add light supports at regular intervals across it to help it keep that shape. Without the supports, the area could fail because it is such a thin strip of resin that it could easily detach from the miniature and cause problems.

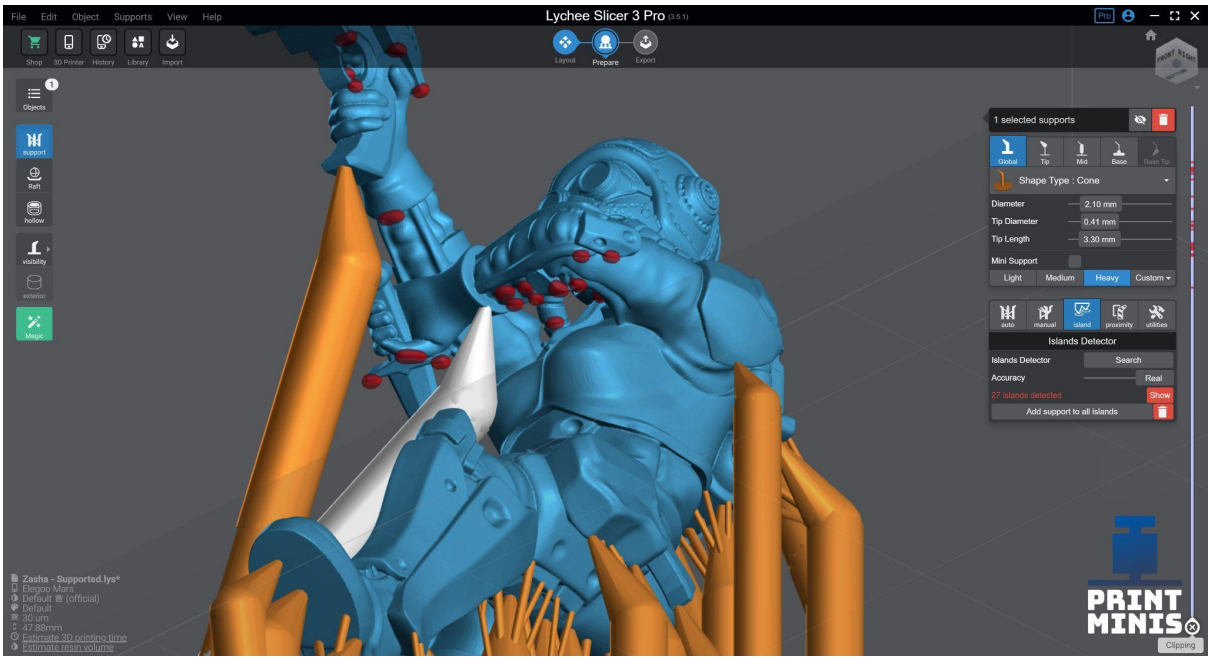
You can see in the next picture that I used medium supports on the centre of the air canister and the base of the backpack because these areas are larger. Most of the other islands use light supports.



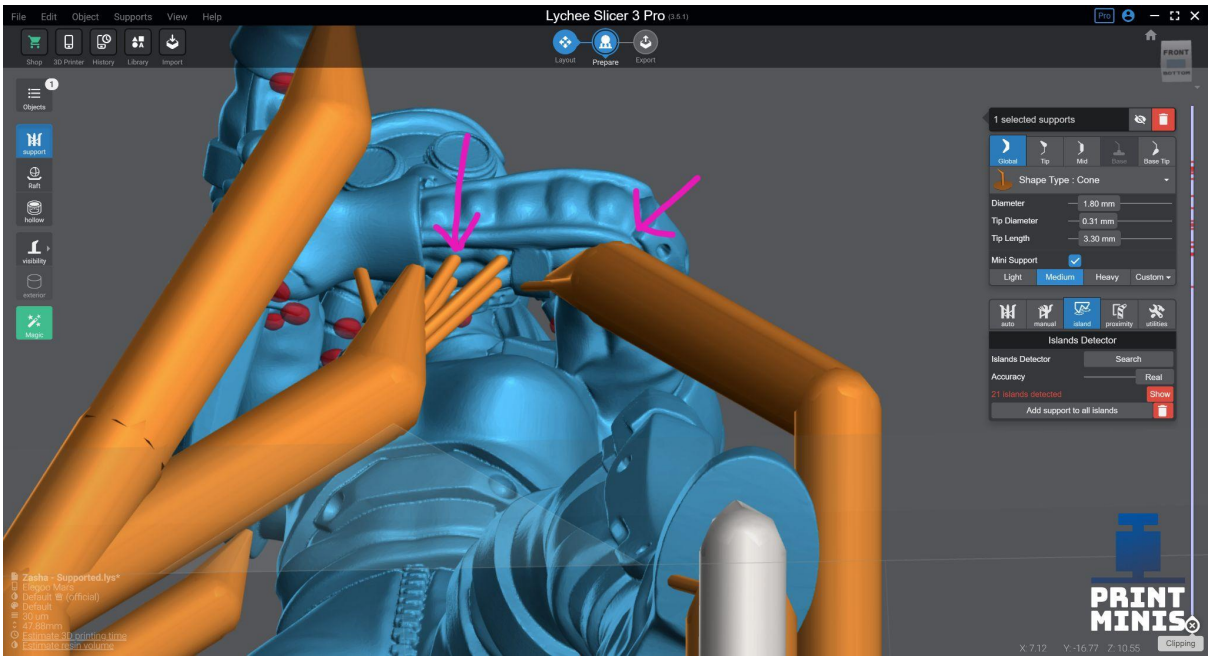
For the islands on the shoulder pads, I felt that light wouldn't be enough and medium might be too heavy and so I added medium supports (because I wanted the 1.8mm body thickness), but then I selected both of the supports by pressing and holding SHIFT while clicking on them, and edited the tip size to 0.25mm. You can do this for any of the standard support sizes if you don't think they're quite right (e.g. 0.35mm or 0.45mm etc).



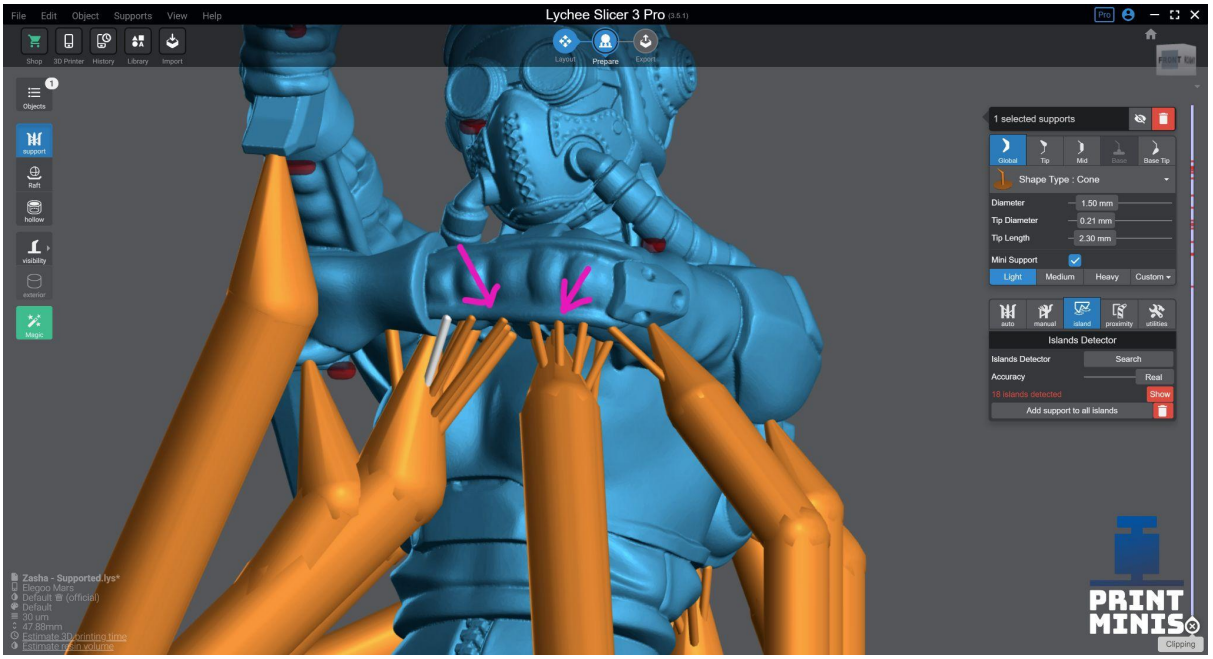
Next we'll move onto supporting the arms, starting with the crossed arm. Below is a before shot of the islands.



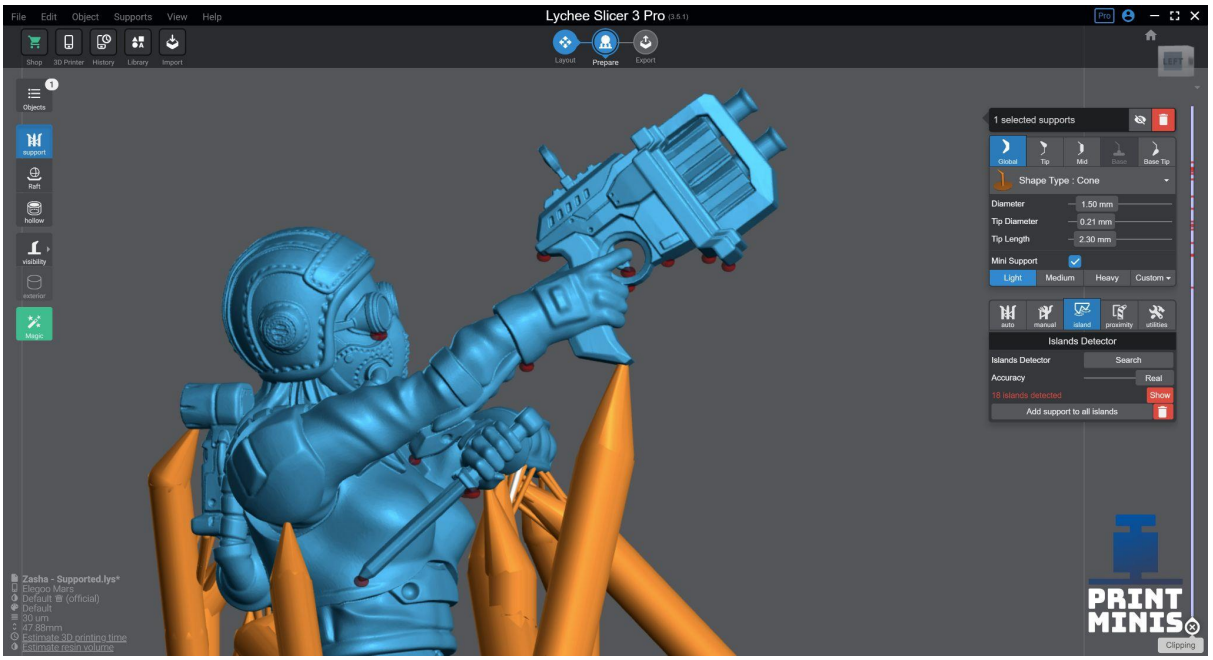
Since this arm prints facing the build plate almost directly on, it will experience quite a lot of pull forces which will cause the detail to flatten. This is one area that is more likely to result in a failure of the supports. Due to this, I used more medium supports here than I normally would for the size of the details to provide the extra support. They are on the underside of the arm and so the increased damage will not be very visible on the miniature.



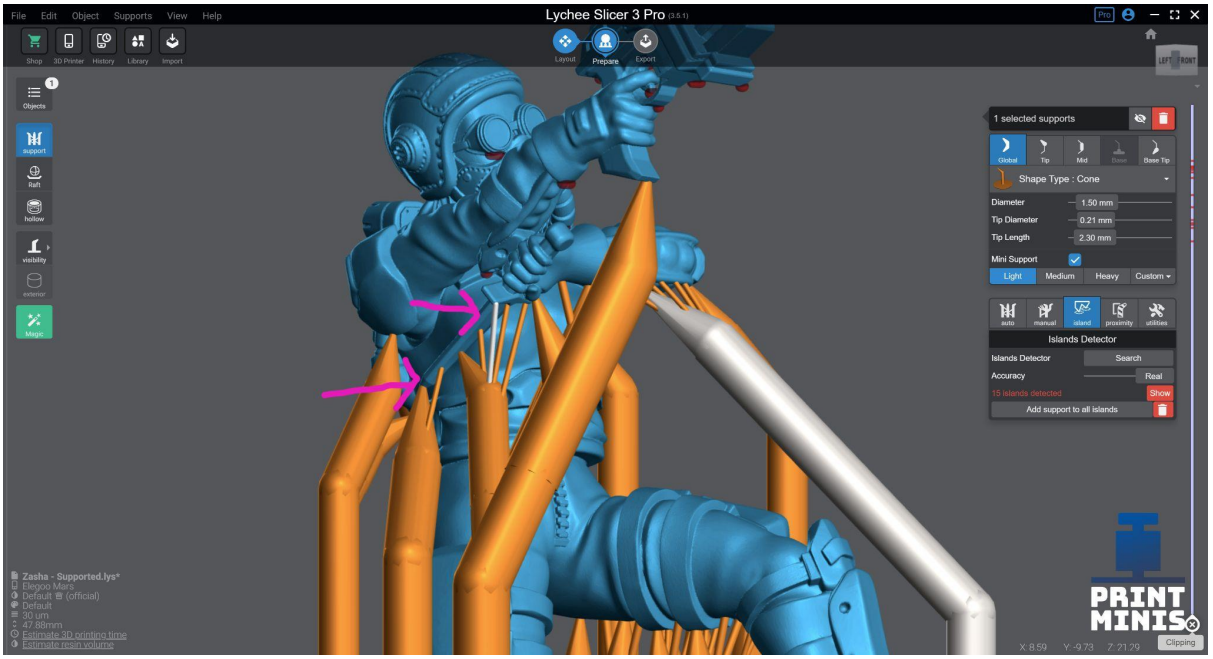
You can also see in the picture below that I added a line of light supports across the jacket detail ridge. This isn't an island but it is a thin section that prints mostly at once, and so I wanted to provide some extra support. As I mentioned before, there is a chance when resin prints in a thin line that it will not remain attached to the miniature when the model is pulled off the FEP during printing. In this case, it may detach from the mini *and* the FEP and become free floating in the resin tank. This is why I will often add light supports along thin edges and lines of detail as a precaution.



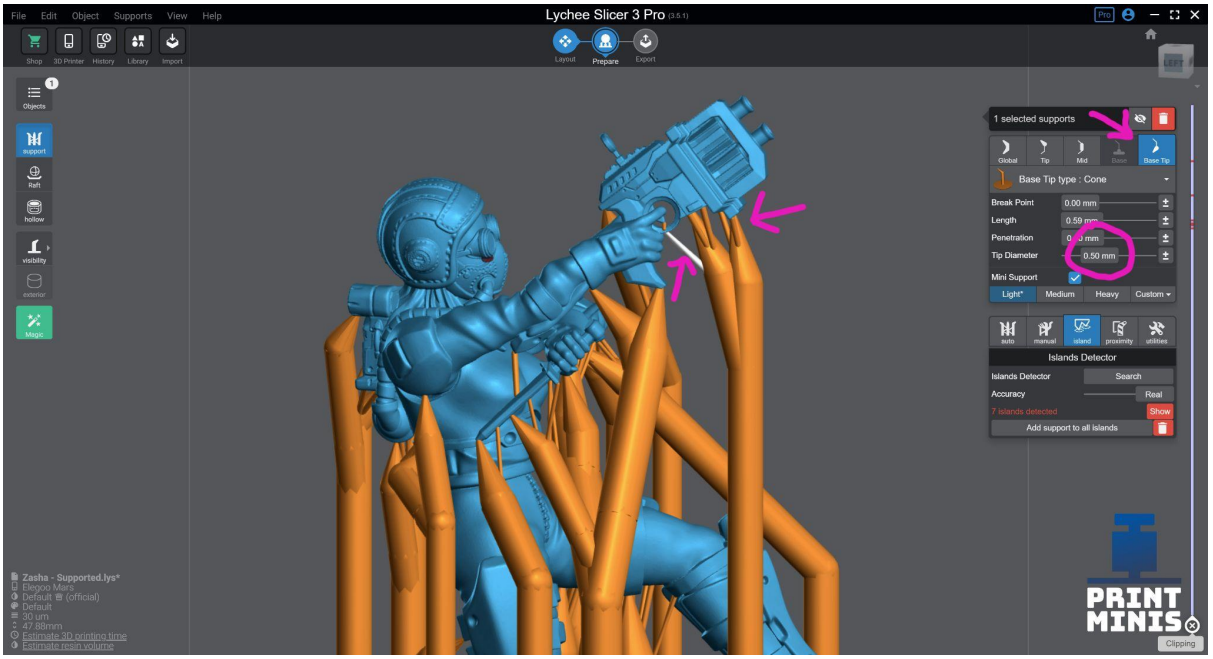
Those supports should now be fine for the crossed arm, so we can move onto the straight arm. Here is a before shot of the islands.



For the knife Zasha is holding, I used a medium support on the island at the tip. This support is too large for the size of the blade, but since it is the starting point for the knife and it supports the knife blade the whole way to the hilt before it joins the miniature, I wanted to prevent any failures. It's possible that 0.25mm would work just as well, and so we can evaluate the strength of that support after test printing the model and see if it needs reducing. Care will certainly need to be taken when removing the support to prevent snapping the knife. I also added light supports along the blade to keep it printing straight.

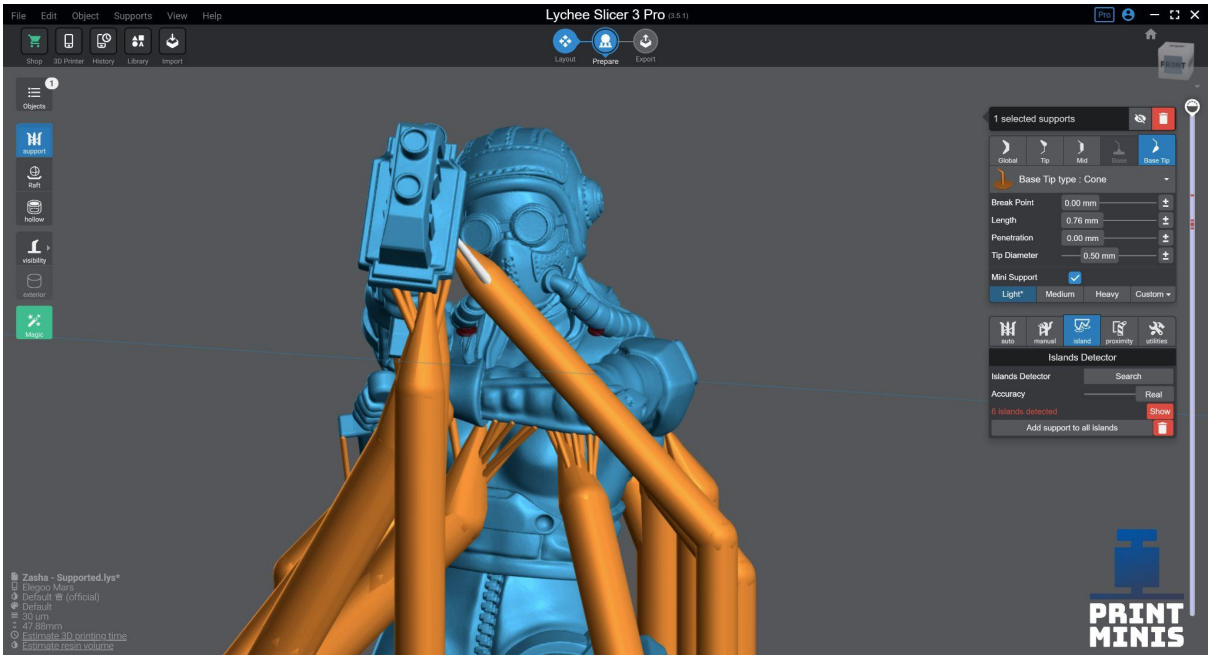


For the gun, I used a lot of medium supports. It's a fairly large weapon and I wanted to make sure it was well supported so the extra weight didn't rest too much on the arm. In the image below, you can see that I've used a light mini support for an island on the trigger and I've attached it to another support on the gun.

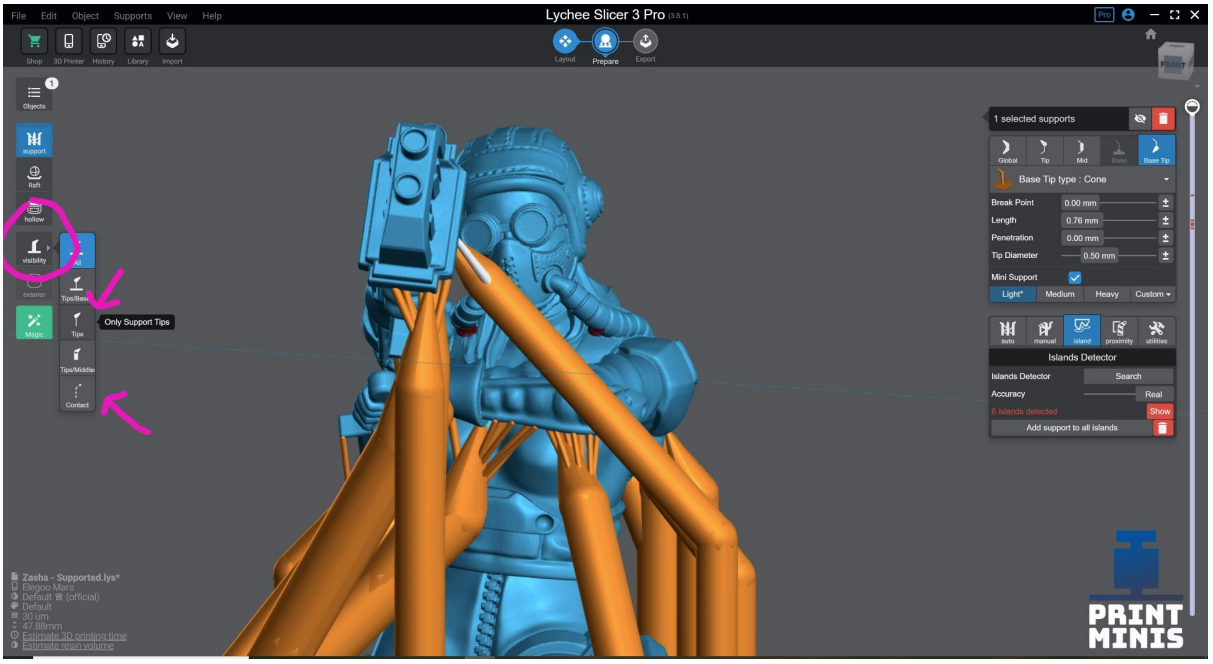


To make the mini support more stable, I then edited the size of the base tip to be larger by heading to the Base Tip tab and changing the Tip Diameter to 0.5mm. This means the support is now thicker at the end where it joins the other support, but remains 0.2mm thick at the tip. This is another example of how you can edit your supports!

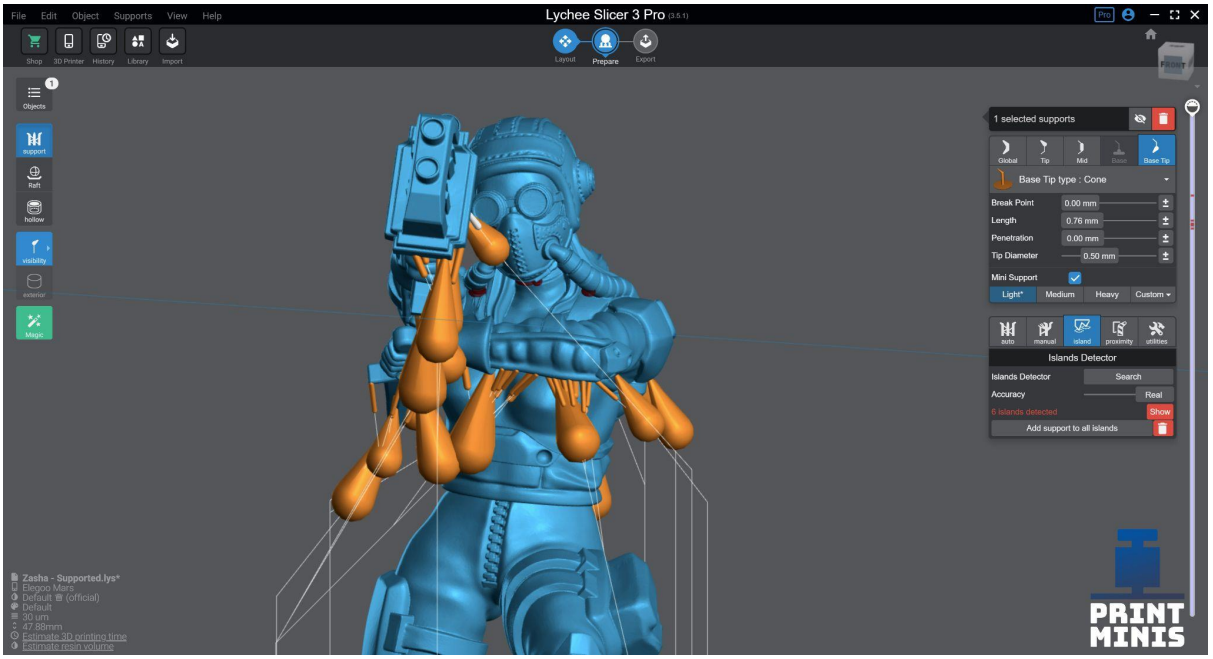
Our remaining islands are on the front of Zasha, but as you can see from the image below, they are quite hard to see because our other supports are now in the way.



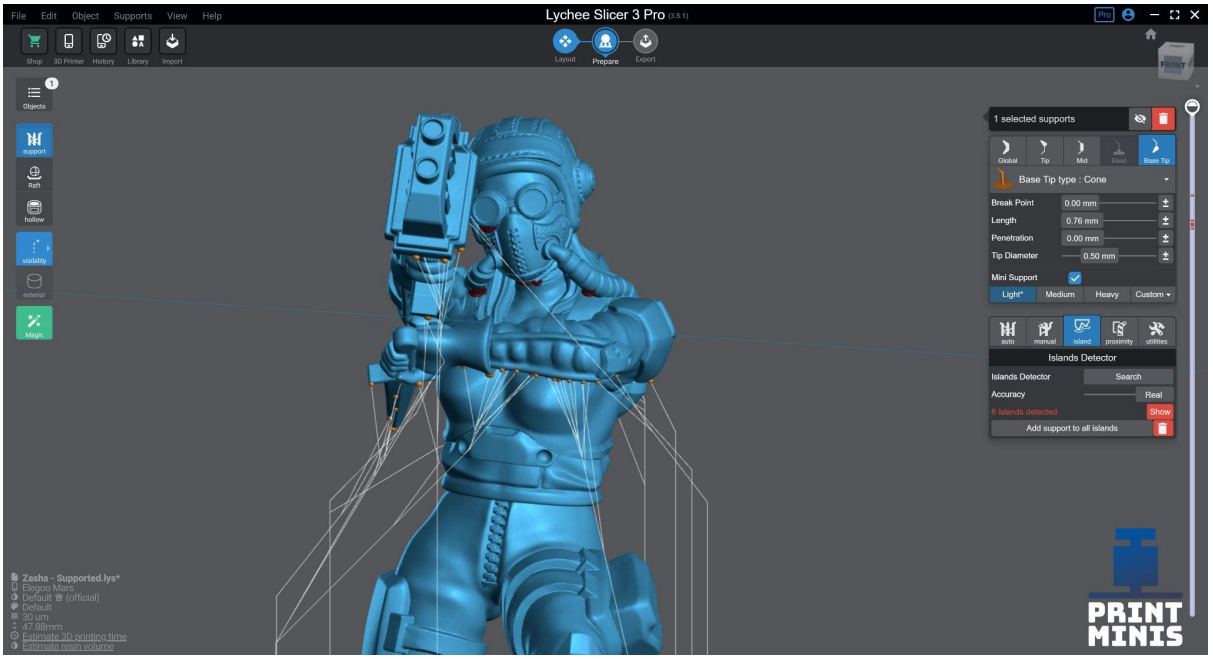
When you are in a situation like this, you can change the support view by clicking Visibility on the left hand menu and changing it to either Tips or Contact.



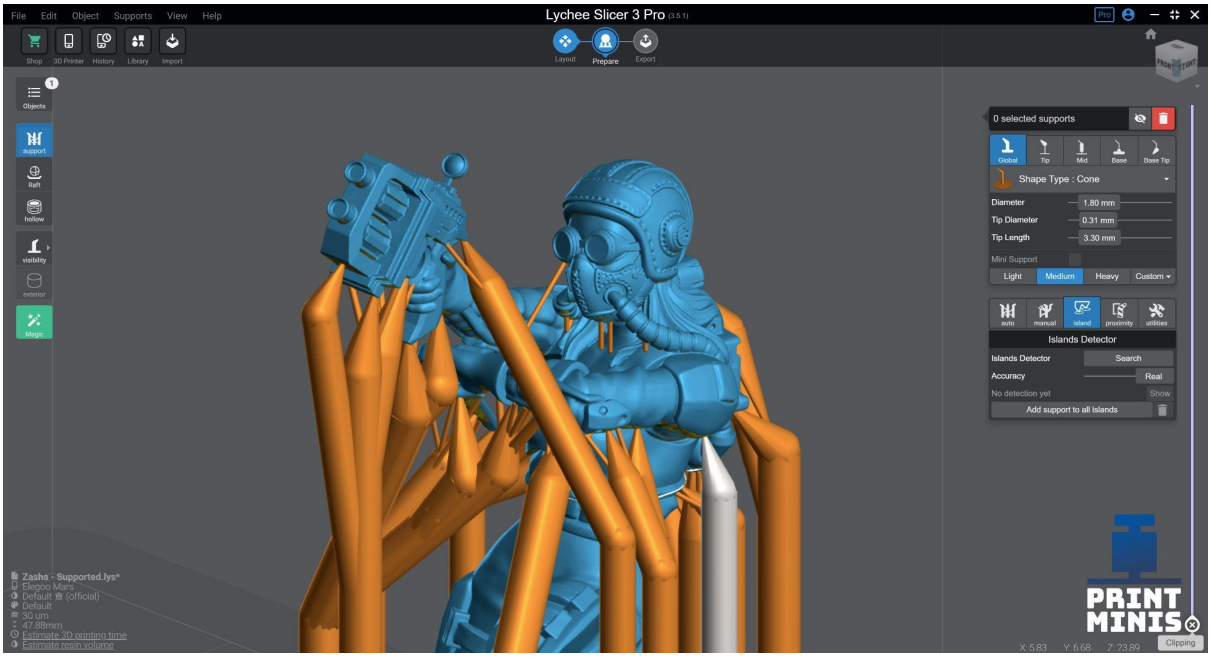
‘Tips’ will just show you the support tips and it is really useful because it enables you to see the model better when you have a lot of supports on there, while also leaving the support tips available to attach mini supports to.



‘Contact’ will just show you a round circle that is the size of the support’s tip diameter, so you can see all the locations you have supports in and what size they are. It also clears your view completely so you can see hard to reach islands.



For the islands, light supports will work absolutely fine. If you edited your support settings earlier to increase the base tip size to 0.5mm, then make sure you click on Light again to return them to their default. This is because the supports will be connected to the miniature this time (instead of another support) and so you only want a tip size of 0.2mm for both ends to cause the least amount of damage.



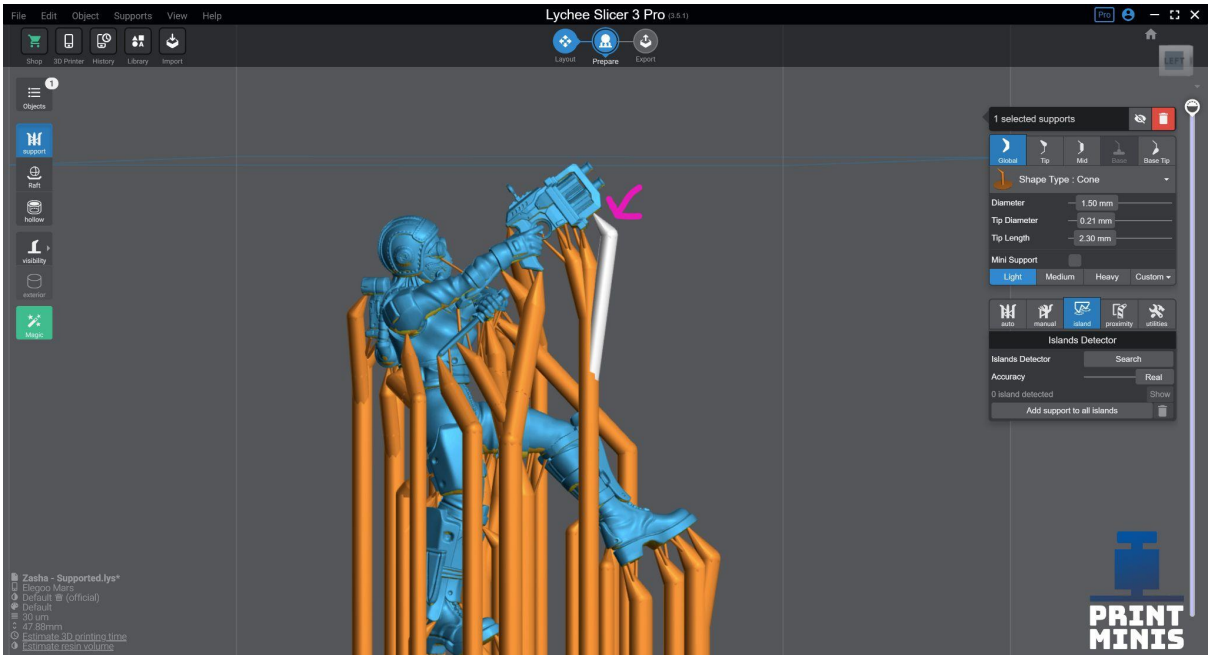
The light support going to Zasha's goggles was attached to her gloved hand in front. I didn't increase the base tip here even though it's a long distance for a light support to traverse, because I didn't want to leave a support mark on her glove.

Checking Your Work!

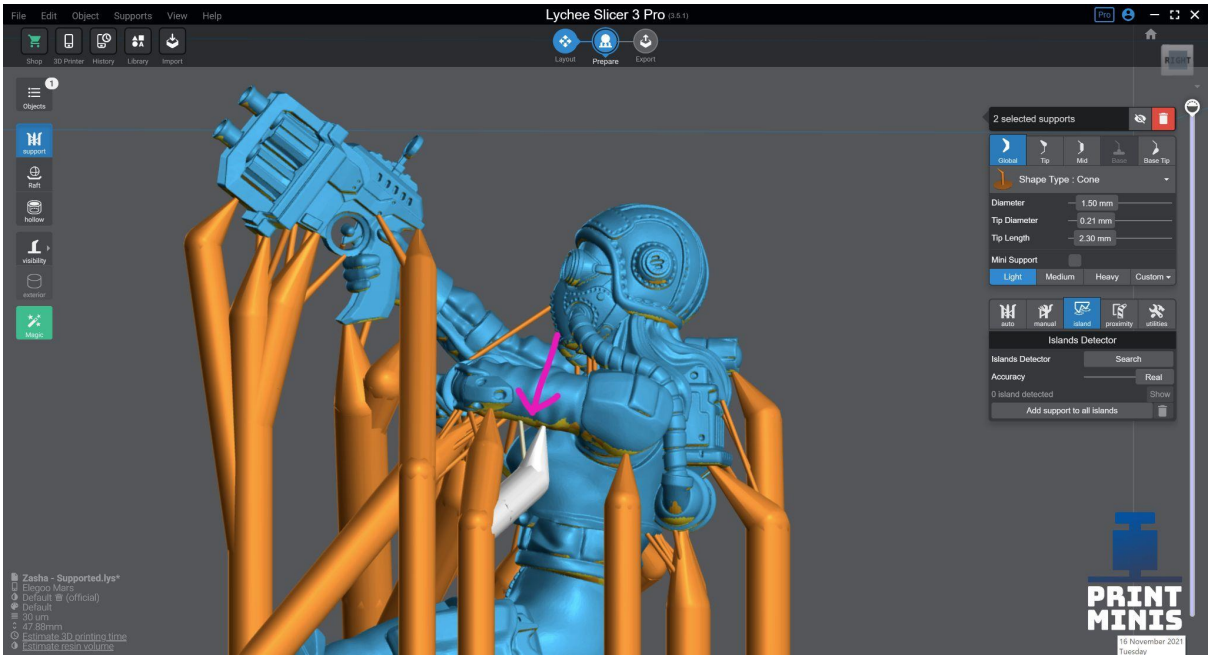
As a final step in supporting miniatures, once I've finished supporting all the islands, I give the miniature a careful look over. You can do this on 'contact' visibility as well as on 'all' visibility to help you best assess if you have enough supports, or if you've missed anywhere.

You may also find it helpful to use the visibility bar on the side and scroll up the miniature (like we looked at in the beginning of this guide) just to make sure that all the areas printing have adequate support.

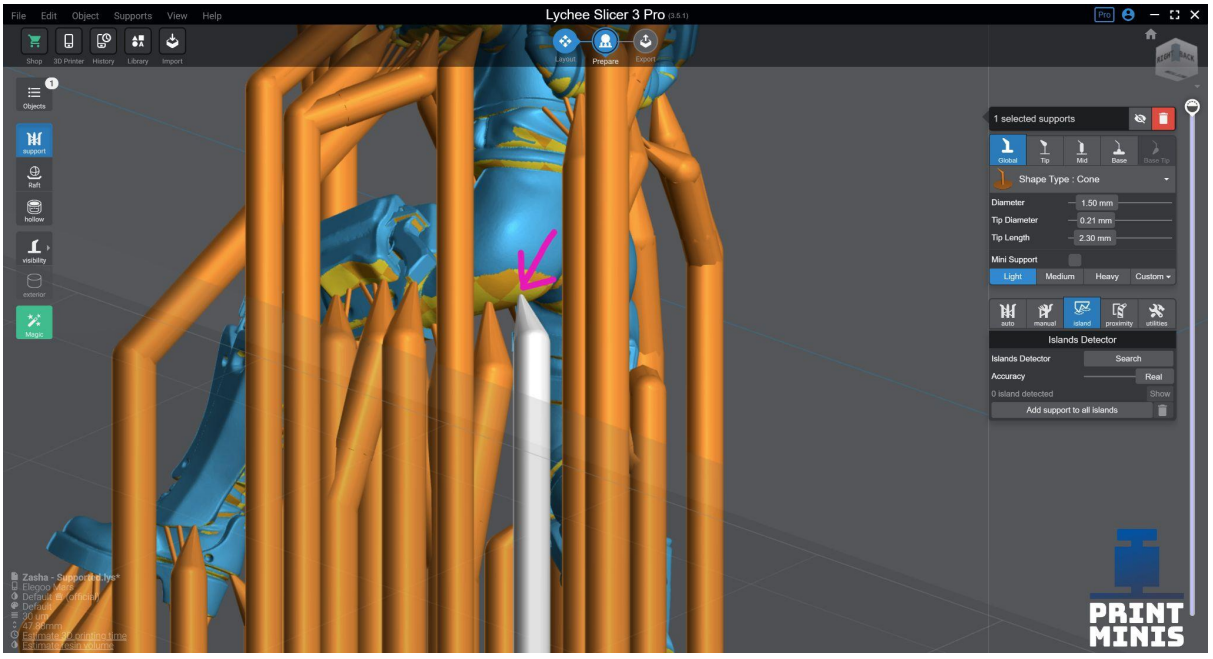
When looking over the miniature, I chose to add supports in four more areas, as shown below:



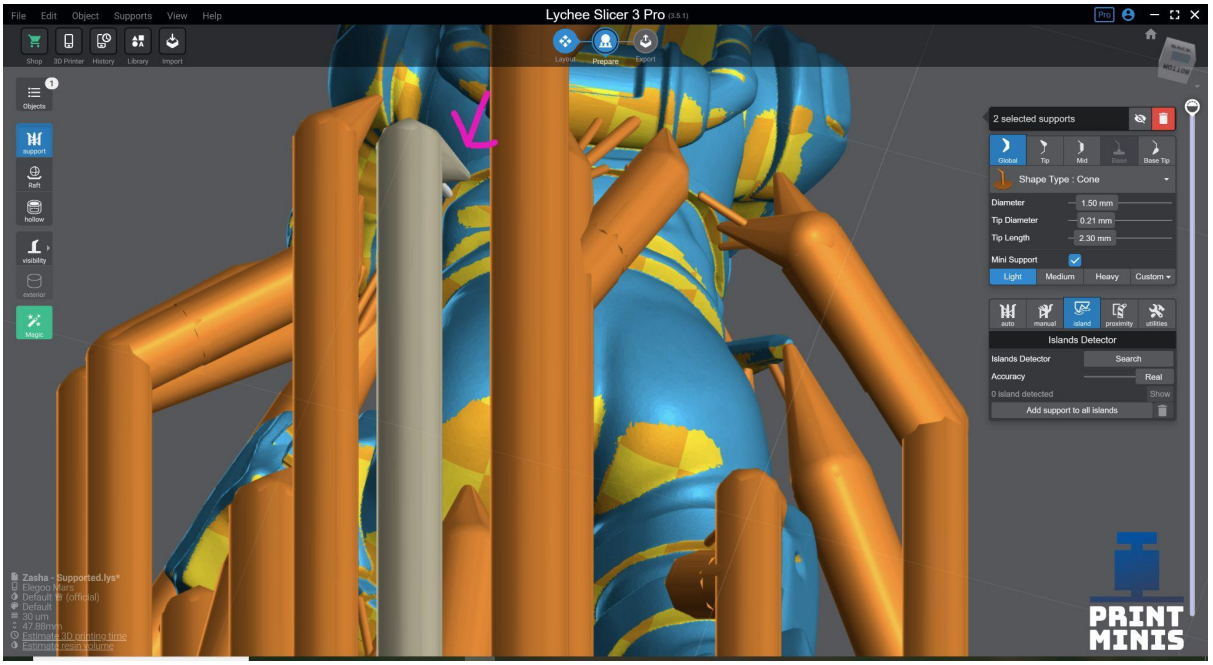
A light support on the gun barrel for more stability. I joined it to the other support for neatness.



A pair of supports going to the crossed arm, both light and one of them mini to avoid crowding the area with support bodies.



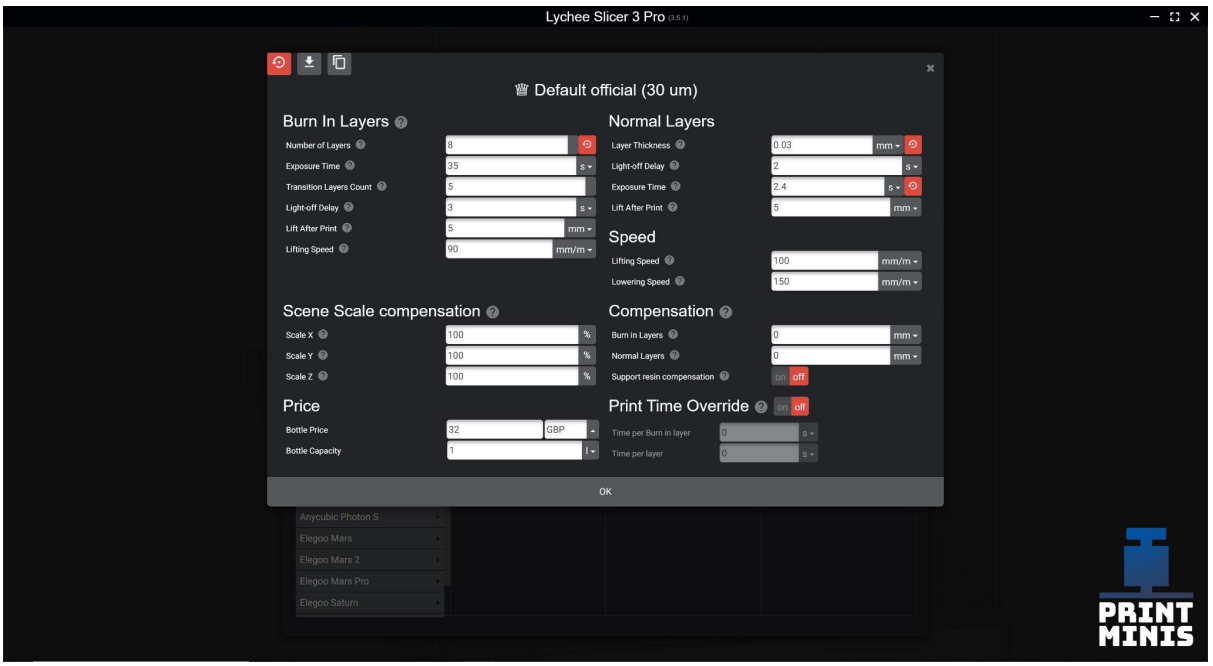
A light support going to her bottom where there are checkerboard markings, indicating the area faces the build plate and so will experience more pull forces. I only used a light support because the pose of the miniature leans forwards which means this area is fairly visible and I wanted to create the least amount of damage while also adding a little extra stability.



Two more supports along the base of the jacket as I didn't feel this area was adequately supported.

Printing Your Miniature

Now that our miniature is supported, it is time to test it! On an Elegoo Mars I would use a layer height of 0.03mm and an exposure time of 8 seconds for the main layers. However, we also own the Mars 2 Pro which captures far more detail than the original generations of printers, so I'll be slicing the miniature for that printer. You can see our settings below, which have always worked well, but are different from the manufacturer recommended ones. I advise testing different settings and choosing your own!



Once you've printed your miniature, you can then assess how the supports worked. Are they easy to take off? Have any of them failed? After cleaning the model up, you'll also be able to see if any of them have left too much damage and could therefore be reduced slightly. Or if there are areas of the miniature which haven't printed properly because either you missed supporting that location or the supports were too light. You can then make all these changes to your supported file.

Usually when supporting your miniatures, you might have a second round of editing the supports and another test print before you get a perfect result. However, the more you practice the better your minis will be the first time around :)

Below you can see how Zasha looks with the supports still attached. Some of them have disconnected during clean up, but worked really well for printing the mini.

When removing the supports, they peeled off easily. Areas to watch out for were the feet where we added the 0.5mm tip anchor supports - if they were too heavy, we might have snapped the foot, and the tip of the knife where we added a 0.3mm support. Also, places like the gun and crossed arms, all of which had heavier supports need to be assessed for ease

of removal. There are also no failed or deformed sections that I noticed, and so our light supports were strong enough in those areas.

Important Note:
When taking your miniature off the build plate, **remove your supports straight away**, then move on to the clean up phase. The only reason you see supports in these images is because I intentionally left them on the model and cured them. However, if you do this and then try to remove the supports, you will most likely break the miniature and if not, you'll leave much worse support marks.

Once you've removed the supports, and cleaned and cured your model, you can inspect the support marks. If you look at the images below, you can see small marks, but nothing too obvious (as most heavy supports are on the underside of the model), and so I wouldn't make any changes to the supports on Zasha.

Tip - I carefully removed all the mini supports with a modelling scalpel which is why there are none left. I also gently removed the supports to prevent causing any large marks as much as possible.

PRINT
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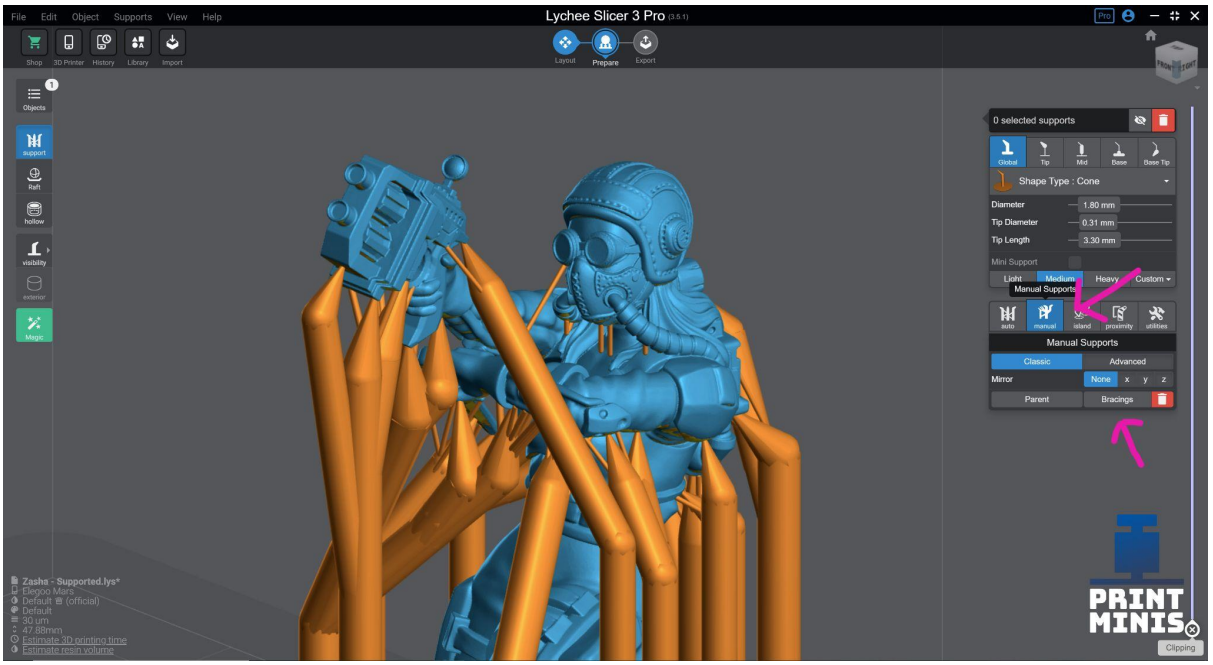
A Note About Bracings

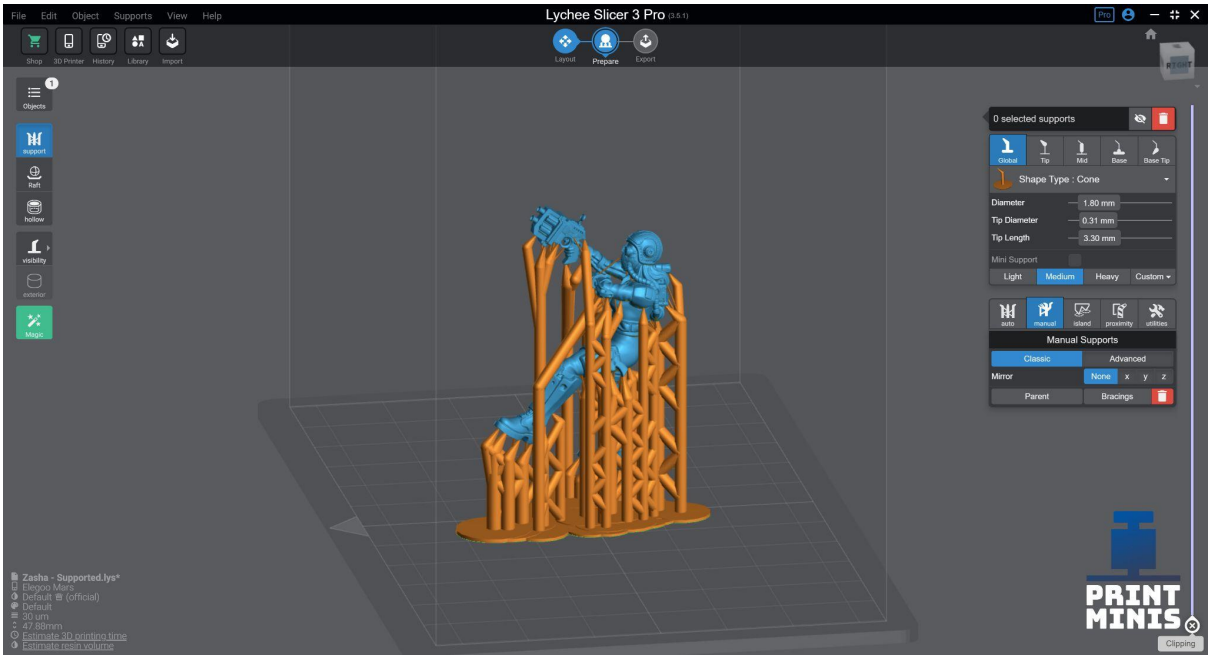
One thing that we haven't covered in this guide is support bracings. These are supports that connect supports together like scaffolding to keep them stable when printing. I tend to use thick support bodies compared to other professionals, and so I find that on characters, I don't need to add bracings which is why I didn't do this with Zasha. However, for thinner supports (e.g. a 1.0mm body) or for larger miniatures which have taller supports, I will use some bracings.

You can find the bracings tab under the Manual tab on the small floating support menu.

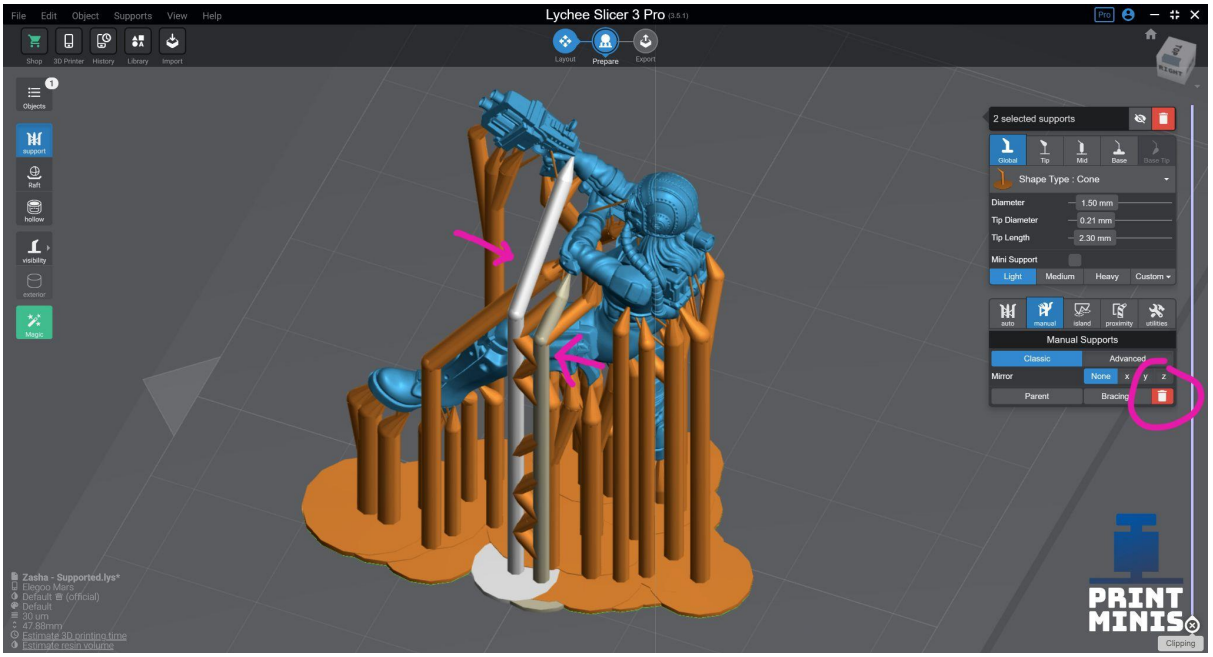


There is an option to click bracings and simply have the software apply them everywhere. However, I never do this. Using that method, you end up with supports connected that don't need the additional support, which wastes resin. The software will also connect each support to all the surrounding supports, which makes them into a solid block which can be difficult to remove from the miniature during clean up.

In the image below, this is what adding bracings everywhere does.



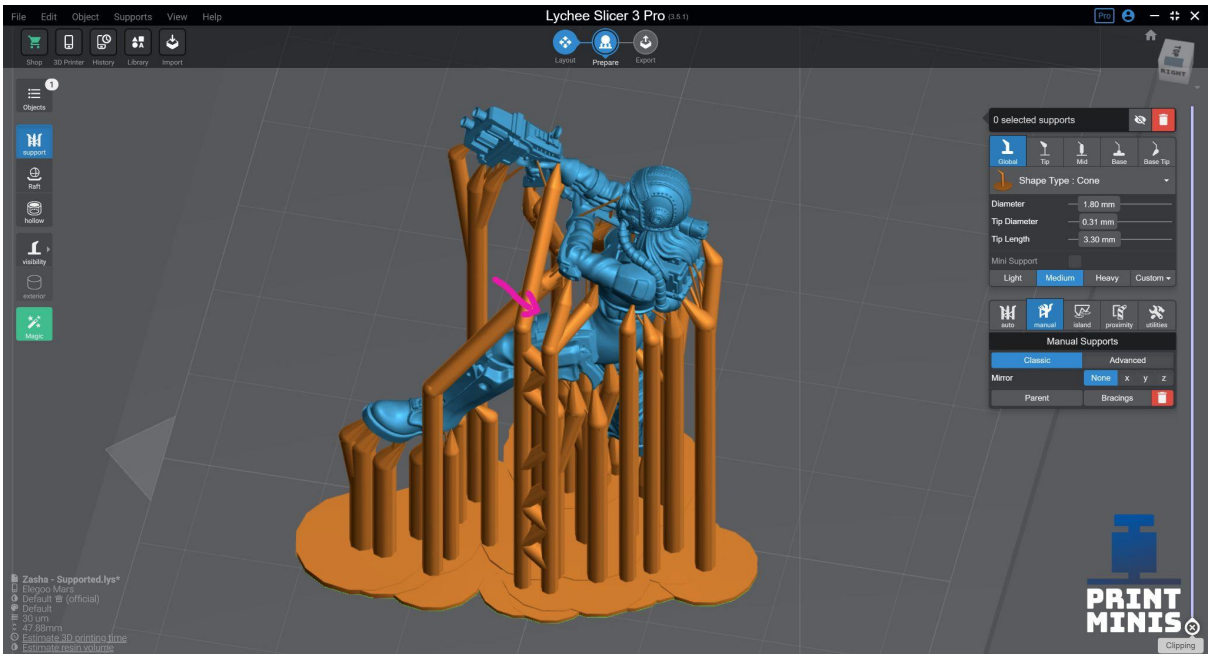
My preferred method of adding any bracings is to choose only the supports with thinner bodies that are taller and might need extra stability. Then I will select those supports by holding SHIFT and clicking a couple at a time. If I click bracings at this point, Lychee will only add them to the selected supports. I will do this in small batches for any support groups that I think need the additional stability.



In the above example, I first clicked the trash symbol to remove the previous supports. Then I selected two supports and added bracings.

Finally, I selected the top rung of the supports and pressed Delete on my keyboard to delete it, as I personally don't like having bracings too close to the miniature. I've found that a little

flexibility in the supports at the top helps them to break away cleanly when removing the supports. This is a personal preference though.



Now that you know the basics of adding, removing and editing bracings, you can experiment with them on your own miniatures.

I hope you found this Supporting Guide helpful! We have a free version of Zasha available to download and practice supporting on if you would like to :)

Free Zasha STL on the Print Minis MMF store:
https://www.myminifactory.com/object/3d-print-195773